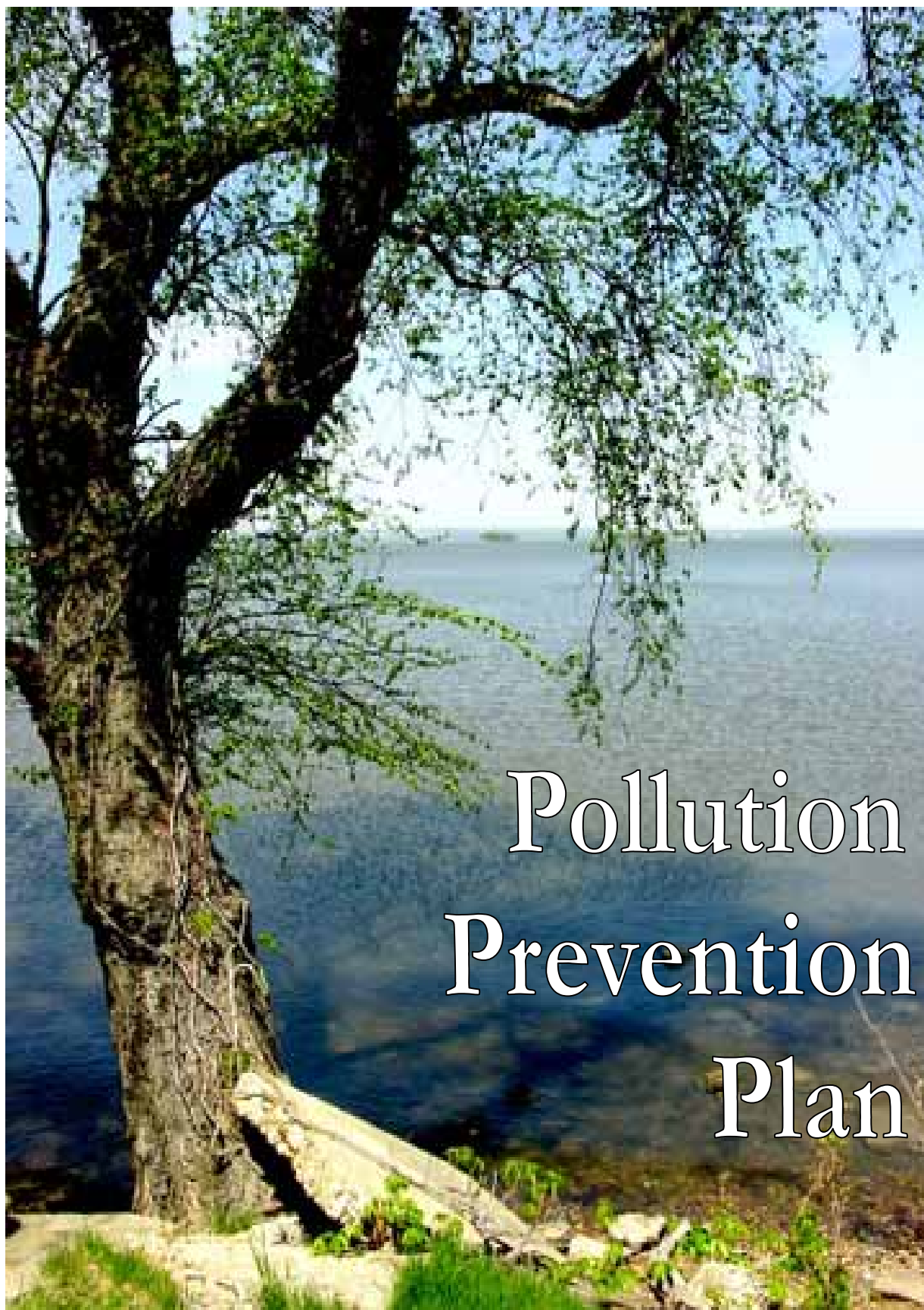


Aberdeen Proving Ground



Pollution Prevention Plan

2004

Pollution Prevention Plan

U.S. Army Aberdeen Proving Ground

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Prepared By

Mr. Robert Solyan

Pollution Prevention Program Manager

Ms. Maia Kaiser

Pollution Prevention Specialist

Directorate of Safety, Health and Environment/AMSSB-GSH-E

U.S. Army Garrison Aberdeen Proving Ground

Aberdeen Proving Ground, Maryland 21005-5001

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TABLE OF CONTENTS

P2 GOAL SUMMARY TABLE	iv
PROJECT SUMMARY TABLE	vi
LIST OF ABBREVIATIONS	xi
CHAPTER 1 INTRODUCTION	1
1.1 STATEMENT OF PURPOSE	1
1.2 BACKGROUND AND MISSION	1
1.3 DEFINITION OF POLLUTION PREVENTION	2
1.4 BENEFITS OF POLLUTION PREVENTION	2
CHAPTER 2 POLLUTION PREVENTION REGULATORY BACKGROUND	4
2.1 FEDERAL LEGISLATION	4
2.2 STATE POLLUTION PREVENTION LEGISLATION	5
2.3 PRESIDENTIAL EXECUTIVE ORDERS	5
2.4 DEPARTMENT OF DEFENSE DIRECTIVES AND INSTRUCTIONS	7
CHAPTER 3 INSTALLATION POLLUTION PREVENTION PROGRAM	9
3.1 POLICY	9
3.2 POLLUTION PREVENTION MANAGEMENT STRUCTURE	9
3.3 BASELINE DEVELOPMENT	10
3.4 OPPORTUNITY ASSESSMENTS	11
3.5 POLLUTION PREVENTION GOALS	11
3.6 IMPLEMENTATION AND EVALUATION	11
3.7 REPORTING REQUIREMENTS	12
3.8 POLLUTION PREVENTION PROJECT FUNDING	13
CHAPTER 4 COMPLIANCE THROUGH POLLUTION PREVENTION	14
4.1 DESCRIPTION OF COMPLIANCE THROUGH POLLUTION PREVENTION	14
4.2 COMPLIANCE SITES	14
4.3 COMPLIANCE THRESHOLDS	15
4.4 DESCRIPTION OF FORM R RELEASES	15
CHAPTER 5 HAZARDOUS AND INDUSTRIAL WASTE	17
5.1 PREVENTION GOAL	17
5.2 BASELINE AND PROGRESS	17
5.3 DESCRIPTION OF MAJOR WASTE-GENERATING ACTIVITIES	18
5.4 CURRENT POLLUTION PREVENTION INITIATIVES	19
5.5 POTENTIAL POLLUTION PREVENTION INITIATIVES	23
CHAPTER 6 SOLID WASTE	24
6.2 DESCRIPTION OF MAJOR SOLID WASTE STREAMS	25
6.3 CURRENT POLLUTION PREVENTION INITIATIVES	25
6.4 POTENTIAL POLLUTION PREVENTION INITIATIVES	27
CHAPTER 7 AIR EMISSIONS	28
7.2 DESCRIPTION OF MAJOR EMISSION SOURCES	28
7.3 CURRENT POLLUTION PREVENTION INITIATIVES	28
7.4 POTENTIAL POLLUTION PREVENTION INITIATIVES	32
CHAPTER 8 WATER AND WASTEWATER	33
8.2 CURRENT POLLUTION PREVENTION INITIATIVES	33
8.3 POTENTIAL POLLUTION PREVENTION INITIATIVES	34
CHAPTER 9 TOXIC RELEASE INVENTORY FORM R RELEASES	36
9.2 DESCRIPTION OF FORM R RELEASES	36
9.3 CURRENT POLLUTION PREVENTION INITIATIVES	37
9.4 POTENTIAL POLLUTION PREVENTION INITIATIVES	40

CHAPTER 10	EPA PRIORITY CHEMICAL REDUCTION	41
10.2	CURRENT POLLUTION PREVENTION INITIATIVES	42
10.3	POTENTIAL POLLUTION PREVENTION INITIATIVES	43
CHAPTER 11	OZONE DEPLETING SUBSTANCES	44
11.1	PREVENTION GOAL	44
11.2	BASELINE AND PROGRESS	44
11.3	DESCRIPTION OF ODS-CONTAINING EQUIPMENT	44
11.4	CURRENT POLLUTION PREVENTION INITIATIVES	44
11.5	POTENTIAL POLLUTION PREVENTION INITIATIVES	45
CHAPTER 12	VEHICLE FUEL CONSERVATION	46
12.1	PREVENTION GOALS	46
12.2	BASELINES AND PROGRESS	46
12.3	CURRENT POLLUTION PREVENTION INITIATIVES	46
12.4	POTENTIAL POLLUTION PREVENTION INITIATIVES	47
CHAPTER 13	ENERGY CONSERVATION	48
13.1	PREVENTION GOAL	48
13.2	BASELINE AND PROGRESS	48
13.3	CURRENT POLLUTION PREVENTION INITIATIVES	48
13.4	POTENTIAL POLLUTION PREVENTION INITIATIVES	49
CHAPTER 14	AFFIRMATIVE PROCUREMENT	50
14.1	PREVENTION GOALS	50
14.2	BASELINE AND PROGRESS	50
14.3	CURRENT POLLUTION PREVENTION INITIATIVES	50
14.4	POTENTIAL POLLUTION PREVENTION INITIATIVES	54

Figure 1-1.	Map of Aberdeen Proving Ground.....	1
Figure 2-1.	Pollution prevention hierarchy	4
Figure 5-1	An aqueous parts washer being used by a Directorate of Logistics contractor.	20
Figure 5-2	Some Aberdeen Proving Ground Activities recover oil from used rags.	22
Figure 6-1	Two large ship engines that were deconstructed.	25
Figure 6-2	Compressed air sprayers and citrus based cleaners replace aerosol solvents for cleaning and degreasing.....	27
Figure 7-1	A paint that meets the Aberdeen Proving Ground Environmentally Preferable Paint Standard displays the Pollution Prevention Program Label.	31
Figure 9-2	A poster displays the hazardous material yearly barcode color changes.	38
Figure 14-1	Environmentally Preferable Products in the Office Eagle are labeled with an Aberdeen Proving Ground Pollution Prevention Program logo.	50
Figure 14-2	Posters explaining the criteria used to determine environmental preferability hang in the front of each Aberdeen Proving Ground Office Eagle.....	51

Table 4-1	Quantity of hazardous waste storage areas	14
Table 4-2	TRI Form R Releases (Total pounds released per calendar year).....	15
Table 5-1	Hazardous waste	17
Table 5-2	Non-Hazardous industrial waste	17
Table 6-1	Solid Waste.....	24
Table 7-1	Air Emissions	28
Table 7-2	APG VOC Limits for Paints.....	29
Table 7-3	Inorganic Components Prohibited by APG Standards for Paints	29
Table 7-4	Organic Compounds Prohibited by APG Standards for Paints	30
Table 8-1	Water Consumption	33
Table 8-2	Wastewater Generation	33

Table 9-1 TRI Form R Releases (Total pounds released per calendar year).....	36
Table 10-1 Waste Minimization Priority Chemicals	41
Table 11-1 Class I Ozone Depleting Substances	44
Table 12-1 Vehicle Fuel Use.....	46
Table 12-2 Alternative Fueled Vehicle Procurement	46
Table 13-1 Energy Consumption	48

Summary of Pollution Prevention Goals

Media	Goal	Source of Goal	Baseline Year	Target Year	Goal Achieved Y/N/NA
Hazardous Waste	Continuous annual reduction in disposal	Proposed DOD MoM	NA	NA	NA
Solid Waste	40% diversion	DOD MoM	NA	Dec 2005	NA
Air Emissions	Continuous annual reduction in emissions	DOD MoM	NA	NA	NA
Air Emissions	Reduce greenhouse gas emissions from facility energy use 30%	EO 13123	1990	2010	NA
Water Use	Institute environmentally and economically beneficial practices pertaining to landscaping activities.	EO 13148	NA	Oct 2001	NA
	Continuous annual reduction in potable water use	---	NA	NA	NA
Wastewater Generation	Continuous annual reduction in wastewater generation	---	NA	NA	NA
TRI Releases	Determine the feasibility of implementing a hazardous material pharmacy system at the facility.	EO 13148	NA	April 2002	Y
	40% Reduction	EO 13148	2001	Dec 2006	NA
EPA Priority Chemicals	50% Reduction in chemical use	EO 13148	2002	Dec 2006	NA
ODSs	Eliminate Class I ODSs from inventory	Memorandum ASA IL&E	NA	Dec 2003	N
	Develop a plan to phase out the procurement of Class I ODS by December 31, 2010	EO 13148	NA	April 2001	Y
Vehicle Fuel	Increase fleet fuel efficiency by 3 miles per gallon	EO 13149	1999	Dec 2005	NA
	Reduce vehicle petroleum consumption by 20%	EO 13149	1999	Dec 2005	NA

	Ensure that alternative fuels account for 50% of fuels used in dual-fuel vehicles	EO 13149	NA	2005	NA
	Ensure that 75% of vehicles procured in the target year and beyond are alternative fuel vehicles	EO 13149	NA	1999	N
Energy	Reduce facility energy consumption by 30%	EO 13123	1985	2005	NA
	Reduce facility energy consumption by 35%	EO 13123	1985	2010	NA
	For industrial and laboratory activities, reduce energy consumption by 20%	EO 13123	1990	2005	NA
	For industrial and laboratory activities, reduce energy consumption by 25%	EO 13123	1990	2010	NA
	Purchase products with external standby power devices that use no more than one watt in standby power consuming mode.	EO 13221	2001	NA	NA
	Develop technology to convert organic material into energy.	EO 13134	NA	NA	NA
Affirmative Procurement	Train procurement officers and integrate AP into developing plans, work statements, and specifications	EO 13148	NA	NA	NA
Pollution Prevention	Develop a plan that addresses the facility's contribution toward achieving the goals in EO 13148	EO 13148	NA	March 2002	Y

PROJECT SUMMARY TABLE

Project Name	Targeted Pollution Source	Implementation Status and Date	Funding Source	Compliance Thru P2?	P2 Plan Section
Solvent reduction in cleaning and degreasing	Air emissions	Ongoing	See EPRs	Y	5.4.1
ATC's closed-loop battery recycling program	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ATC's return of various gas tanks to manufacturer	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ATC's mobile x-ray truck	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ATC's digital x-ray practices	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ATC's silver recovery unit collection and resale	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ATC's antifreeze-recycling machine	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ATC's reuse of photographic chemicals	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ATC's fuel return	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ATC's fixer recycling and reuse	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ATC's toner cartridge reuse	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ARL's fuel recycling	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ARL's digital photography and pixel ray use	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ARL's water-based cleaners use	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ARL's micro-scale chemistry techniques	Solvent reduction	Ongoing	See EPRs	Y	5.4.2
ARL's water-based paint substitution	Solvent reduction	Ongoing	See EPRs	Y	5.4.2
ARL, ATC, and Garrison's large scale painting operations	Solvent reduction	Ongoing	See EPRs	Y	5.4.2
ARL's replacement of lead rounds	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ARL's reduction of hazardous materials	Waste disposal	Ongoing	See EPRs	Y	5.4.2
CHPPM's reduction of excess chemical turn-in	Waste disposal	Ongoing	See EPRs	Y	5.4.2
CHPPM's excess product return to manufacturer	Waste disposal	Ongoing	See EPRs	Y	5.4.2

DENTAC's silver recovery system for film processing	Waste disposal	Ongoing	See EPRs	Y	5.4.2
DOL, EDSI, and OC&S's rag reuse	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ECBC's digital imaging processes	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ECBC's mercury thermometer reduced use	Waste disposal	Ongoing	See EPRs	Y	5.4.2
ECBC's paraffin/wax replacement	Waste disposal	Ongoing	See EPRs	Y	5.4.2
Deconstruction of ship engines	Waste disposal	Ongoing	See EPRs	Y	6.3.1
HITS	Waste disposal	Ongoing	See EPRs	Y	6.3.2
The EPP Paint Policy	Air emissions	Ongoing	See EPRs	Y	6.3.2, 7.3.2
The Green Building Policy	Air emissions	Ongoing	See EPRs	Y	6.3.2, 7.3.2, 8.2.2
The EPP and Affirmative Procurement Policy	Air emissions	Ongoing	See EPRs	Y	6.3.2, 7.3.2
ARL's scrap metal recycling	Waste disposal	Ongoing	See EPRs	Y	6.3.2
ARL lead-acid battery recycling	Waste disposal	Ongoing	See EPRs	Y	6.3.2
ARL's aerosols product replacement	Air emissions	Ongoing	See EPRs	Y	6.3.2
ATC's retread tires use on commercial vehicles	Waste disposal	Ongoing	See EPRs	Y	6.3.2
ATC, Bldg. 402's aerosols product replacement	Air emissions	Ongoing	See EPRs	Y	6.3.2
EDSI's aerosol product reduction	Air emissions	Ongoing	See EPRs	Y	6.3.2
The EPP Paint Study	Air emissions	Ongoing	See EPRs	Y	7.3.1
The HMMP	Air emissions	Ongoing	See EPRs	Y	7.3.2
ARL, ATC, and the Garrison's use of aqueous parts washers	Air emissions	Ongoing	See EPRs	Y	7.3.2
ATC's use of low-content VOC paint	Air emissions	Ongoing	See EPRs	Y	7.3.2
ECBC's support of the SPOTA effort	Air emissions	Ongoing	See EPRs	Y	7.3.2
ARL's installation of waterfree urinals	Water use	Ongoing	See EPRs	Y	8.2.1
ATC Building 338's water sanitation processes and reuse	Water use	Ongoing	See EPRs	Y	8.2.2
Comprehensive HMMP Program	Waste disposal	Ongoing	See EPRs	Y	9.3.1
The P2 Policy's reduction of TRI Form R chemical use	Waste disposal	Ongoing	See EPRs	Y	9.3.2

The HMMP's reduction of TRI Form R chemical use	Waste disposal	Ongoing	See EPRs	Y	9.3.2
The EPP's elimination of TRI Form R chemical use	Waste disposal	Ongoing	See EPRs	Y	9.3.2
The Green Building Policy's reduction of TRI Form R chemical use	Waste disposal	Ongoing	See EPRs	Y	9.3.2
The EPP and Affirmative Procurement Policy's reduction of TRI Form R chemical use	Waste disposal	Ongoing	See EPRs	Y	9.3.2
ARL's substitution for TRI chemicals	Waste disposal	Ongoing	See EPRs	Y	9.3.2
ATC's replacement of Brake Kleen solvent	Waste disposal	Ongoing	See EPRs	Y	9.3.2
The DSHE P2 Program's informational website	All	Ongoing	See EPRs	Y	9.3.2
The P2 Policy's EPA Priority chemicals reduction	Chemical reduction	Ongoing	See EPRs	Y	10.2
The HMMP's reduction in EPA priority chemicals use	Chemical reduction	Ongoing	See EPRs	Y	10.2
The EPP's elimination of EPA Priority chemicals use	Chemical reduction	Ongoing	See EPRs	Y	10.2
The Green Building Policy's reduction of EPA Priority chemicals use	Chemical reduction	Ongoing	See EPRs	Y	10.2
The EPP and Affirmative Procurement Policy's reduction of EPA Priority chemicals use	Chemical reduction	Ongoing	See EPRs	Y	10.2
ATC's identification of PBT-containing products and discontinued use	Chemical reduction	Ongoing	See EPRs	Y	10.2
The P2 Policy's support in elimination of ozone depleting substances.	Air emissions	Ongoing	See EPRs	Y	11.4
The HMMP's support of elimination of ozone depleting substances	Air emissions	Ongoing	See EPRs	Y	11.4
The Green Building Policy's support of elimination of ozone depleting substances	Air emissions	Ongoing	See EPRs	Y	11.4
The EPP and Affirmative Procurement Policy's support of elimination of ozone depleting substances	Air emissions	Ongoing	See EPRs	Y	11.4
Elimination of class I ODSs in refrigeration	Air emissions	Ongoing	See EPRs	Y	11.4

units					
Vehicle Fuel Conservation	Air emissions	Ongoing	See EPRs	Y	12.3
The HMMP's reduced use of gasoline with HITS	Air emissions	Ongoing	See EPRs	Y	12.3
APG's fuel-efficient vehicles	Air emissions	Ongoing	See EPRs	Y	12.3
ARL employees drive CNG and hybrid vehicles.	Air emissions	Ongoing	See EPRs	Y	12.3
ARL's research in hybrid tactical vehicles	Air emissions	Ongoing	See EPRs	Y	12.3
APG Energy Efficient Standby Power Devices Policy's reduction of energy consumption	Energy conservation	Ongoing	See EPRs	Y	13.3
The P2 Policy's direct reduction in energy use	Energy conservation	Ongoing	See EPRs	Y	13.3
The Green Building Policy's reduction in energy consumption	Energy conservation	Ongoing	See EPRs	Y	13.3
Project Aberdeen Conserves Energy	Energy conservation	Ongoing	See EPRs	Y	13.3
Lighting Retrofits	Energy conservation	Ongoing	See EPRs	Y	12.3
Fuel Oil to Natural Gas Conversions.	Energy conservation	Ongoing	See EPRs	Y	12.3
EPP at the Office Eagle	Affirmative procurement	Ongoing	See EPRs	Y	14.3.1
Spray Paint Substitution at ARL	Affirmative procurement	Ongoing	See EPRs	Y	14.3.2
The EPP and Affirmative Procurement Policy's increase in affirmative procurement	Affirmative procurement	Ongoing	See EPRs	Y	14.3.3
The P2 Policy's increase in affirmative procurement	Affirmative procurement	Ongoing	See EPRs	Y	14.3.3
The Green Building Policy's increase in affirmative procurement	Affirmative procurement	Ongoing	See EPRs	Y	14.3.3
HITS as a promoter for EPP program	Affirmative procurement	Ongoing	See EPRs	Y	14.3.3
P2 Program and AMC's development of affirmative procurement module	Affirmative procurement	Ongoing	See EPRs	Y	14.3.3
P2 Program's PPOA with DIO's Re-Nu-It Center	Affirmative procurement	Ongoing	See EPRs	Y	14.3.3
P2 Program's incorporation of green	Affirmative	Ongoing	See EPRs	Y	14.3.3

building design review process	procurement				
P2 Program's research and recommendation of green building technologies	Affirmative procurement	Ongoing	See EPRs	Y	14.3.3
Construction of AEC's Platinum level SpiRiT headquarters	Affirmative procurement	Ongoing	See EPRs	Y	14.3.3
ATC personnel's review of inventory	Affirmative procurement	Ongoing	See EPRs	Y	14.3.3
Construction of APG buildings to be Gold level SpiRiT	Affirmative procurement	Ongoing	See EPRs	Y	14.3.3

LIST OF ABBREVIATIONS

ACE – Aberdeen Conserves Energy
AMC – Army Materiel Command
APG – Aberdeen Proving Ground
ARL – Army Research Laboratory
ATC – Aberdeen Test Center
BISM - Blind Industry and Services of Maryland
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act
CHPPM – Center for Health Promotion and Preventative Medicine
CNG – compressed natural gas
CY – calendar year
DENTAC – Dental Clinic
DIO – Directorate of Installation Operations
DOD – Department of Defense
DOL - Directorate of Logistics
DRMO – Defense Reutilization and Marketing Office
DSHE – Directorate of Safety, Health and Environment
DTC – Developmental Test Command
ECD – environmental compliance division
EDSI – Engineering Documentation Systems, Inc.
EO – executive order
EPA – Environmental Protection Agency
EPAS – environmental performance assessment system
EPAR - environmental performance assessment report
EPCRA – Emergency Planning and Community Right-To-Know Act
EPP – environmentally preferable purchasing/product
EPR – environmental program requirements
EQCC – environmental quality control committee
EQR – environmental quality report
FY – fiscal year
HAP – hazardous air pollutants
HITS – Hazardous Inventory Tracking System
HSWA – hazardous and solid waste amendments
HVLP – high volume low pressure
ICAP – installation corrective action plan
IMA – Installation Management Agency
LID- low impact development
MDE – Maryland Department of the Environment
MOA – Memorandum of agreement
MPG – miles per gallon
MRICD – Medical Research Institute of Chemical Defense
MSDS – material safety data sheet
NEPA – National Environmental Policy Act
NESHAP - National Emission Standards for Hazardous Air Pollutants
OC&S – Ordnance Center and School
ODC – ozone-depleting chemical
ODS – ozone-depleting substance
OSHA – Occupational Safety and Health Administration
P2 – pollution prevention
PBT - persistent bioaccumulative toxins

PPOA – pollution prevention opportunity assessment
PPA – pollution prevention act]
RCRA- Resource Conservation and Recovery Act
TRI – Toxic Release Inventory
SAS – satellite accumulation site
SPOTA – sustainable painting operations for the total army
VOC – volatile organic compound

CHAPTER 1 INTRODUCTION

1.1 STATEMENT OF PURPOSE

This Plan establishes this installation's commitment to environmental leadership in pollution prevention (P2) by outlining the concepts and practices necessary to reduce the use of hazardous materials and the release of pollutants. This Plan is also a tool for Aberdeen Proving Ground (APG) to document, track, and manage its P2 efforts in pursuit of achieving P2 goals.

APG has a long history of pollution prevention, starting as early as 1985 with its Hazardous Waste Management Program that achieved large reductions in waste generation. Since then, APG has made substantial progress in identifying and implementing alternatives to traditional "end of pipe" solutions to environmental problems that focus on cost-effective source elimination or reduction, recycling, or waste minimization. APG is committed to executing a fiscally sound P2 program to reduce the environmental management burden.

1.2 BACKGROUND AND MISSION

APG, the Army's oldest active proving ground, was established on October 20, 1917, six months after the United States entered World War I, to provide the military a facility where design and testing of ordnance materiel could be carried out in close proximity to the nation's industrial and shipping centers. The post officially opened on December 14, 1917, and the first gun was fired on January 2, 1918. APG occupies more than 72,500 acres in Harford County, Maryland. Its northernmost point is marked by the confluence of the Susquehanna River and the Chesapeake Bay. On the south it is bordered by the Gunpowder River. The installation comprises two principal areas separated by the Bush River (see Figure 1-1). The northern area is known as the Aberdeen Area and the southern area as the Edgewood Area, formerly Edgewood Arsenal established in November, 1917 as a chemical weapons research, development and testing facility. The Aberdeen and Edgewood areas were administratively combined in 1971. APG property not attached to the main installation includes the Churchville Test Site in Harford County and Carroll Island and Graces Quarters in Baltimore County.



Figure 1-1. Map of Aberdeen Proving Ground.

APG is home to more than 60 tenants and a host of satellite activities. Among the major tenants are the U.S. Research, Development and Engineering Command, U.S. Army Ordnance Center and School (OC&S), U.S. Army Developmental Test Command, U.S. Army Aberdeen Test Center, U.S. Army Center for Health Promotion and Preventive Medicine, Northeast Region Civilian Personnel Operations Center, U.S. Army Medical Research Institute of Chemical Defense, Program Manager for Chemical Demilitarization, 203rd Technical

Intelligence Unit, and major elements of the Army Research Laboratory. As a center for Army materiel testing, laboratory research and military training, the post is a key element in the nation's defense. All tanks and wheeled vehicles that have served U.S. forces for the past 50 years have been tested for performance and durability at APG – from the M4 Sherman tank of World War II to the M1 tank and High Mobility Multipurpose Wheeled Vehicle of today. Known as the “Home of Ordnance,” APG has been training Army ordnance personnel since 1918. The Army's ordnance training was consolidated at the proving ground during World War II, and today the U.S. Army OC&S provides mechanical maintenance training for more than 20,000 U.S. and foreign personnel each year and is also regimental headquarters for the Army's Chief of Ordnance. APG's Edgewood Area has been a center for chemical warfare research and development since it was established. From the trenches of France and Belgium in World War I to the desert battlefields of Iraq nearly 75 years later, the work done at APG has contributed to the defense and safety of American forces threatened by chemical weapons.

More than 7,500 civilians work at APG, and more than 4,700 military personnel are assigned there. In addition, there are nearly 3,000 contractors and private business employees working on the proving ground. There are 2,700 military family members living on the post and another 243 off post. The post supports more than 16,000 military retirees and retiree family members. The post is Harford County's largest employer and one of the largest employers in the state of Maryland.

U.S. Army Garrison, APG, provides general, administrative and logistical support to the post's tenants and satellite activities, and is responsible for the management and operation of the entire installation, which in many ways is like a small city. APG has more than 2,200 buildings with more than 15 million square feet of building space. The post has more than 300 miles of improved roads, 30 miles of railroad and more than 567,000 square yards of airfield pavement. APG's electrical distribution systems total nearly 2.25 million linear feet. It has more than 215,000 linear feet of steam and hot water distribution lines. APG's water distribution system can handle as much as 7 million gallons a day and its sewer facilities have a daily capacity of 4 million gallons. The post operates a fleet of more than 1,000 vehicles of all types and sizes.

Environmental stewardship is an essential component of all activity at APG. The installation and its tenants are actively involved in a wide variety of environmental compliance, P2, conservation, and restoration programs.

1.3 DEFINITION OF POLLUTION PREVENTION

Pollution prevention encompasses those activities that reduce the quantity of hazardous, toxic, or industrial pollutants at the source by changing the production, industrial, or other waste-generating process. Pollution prevention includes not only limiting hazardous pollutants released to air, water, and land, but also reducing non-hazardous commercial and household wastes.

Pollution prevention is any method other than treating pollution at the discharge end of a pipe or stack that successfully and cost-effectively avoids, prevents, or reduces the sources of pollutant discharges or emissions. A P2 project is one that applies source reduction, recycling, or waste minimization in order to reduce pollution from an installation's current business practices, industrial processes, base operations, or other routine activities.

1.4 BENEFITS OF POLLUTION PREVENTION

As concern for the environment has risen in our society, increased environmental regulation and public awareness have raised the standards, costs, and potential liabilities of waste management practices. Waste and resource management programs that adopt P2 principles can realize benefits on many different fronts

- Reduced costs associated with the procurement and storage of hazardous materials and subsequent disposal of hazardous waste
- Reduced costs associated with the management, and treatment of hazardous wastes
- Decreased use of energy and water resources
- Enhanced relations with the public, neighboring communities, and regulators
- Reduced costs of complying with environmental and hazardous materials regulations, and diminished risk of non-compliance
- Reduced future compliance liability
- Improved long-term environmental quality and prevention of environmental degradation

CHAPTER 2 POLLUTION PREVENTION REGULATORY BACKGROUND

The Army's pollution prevention (P2) policies originate in legislation enacted by the U.S. Congress. Executive orders (EOs) direct federal agencies, including the Department of Defense (DOD), to conform to federal legislation and may impose non-legislated requirements as well. DOD issues directives and instructions in response to EOs. These DOD policy statements are interpreted and promulgated in Army regulations, pamphlets, and other policy documents. In addition, major Army commands, major subordinate commands, and individual installations may adopt supplemental policies. This section provides summaries of the major laws, EOs, and DOD policy statements pertaining to pollution prevention. Due to the wide-reaching nature of P2 issues and frequent changes to laws and regulations, the list is not intended to be all-inclusive.

2.1 FEDERAL LEGISLATION

2.1.1 Resource Conservation and Recovery Act of 1976

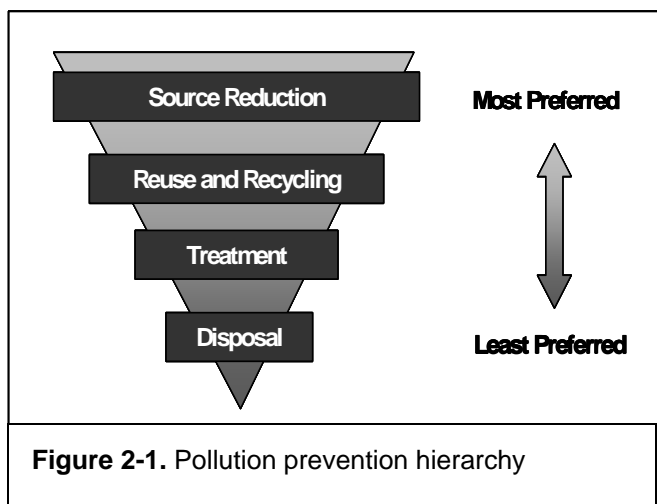
An early legal impetus for P2 practices. "...It shall be a condition of any permit issued under this section for the treatment, storage, or disposal of hazardous waste on the premises where such waste was generated that the permittee certify, no less often than annually, that the generator of the hazardous waste has a program in place to reduce the volume or quantity and toxicity of such waste to the degree determined by the generator to be economically practicable."

2.1.2 Comprehensive Environmental Response, Compensation, and Liability Act of 1980

This act required that generators of hazardous wastes must evaluate and document their procedures for controlling the environmental effects of their operations.

2.1.3 Hazardous and Solid Waste Amendments of 1984

This act required all Resource Conservation and Recovery Act regulated generators of hazardous waste to develop waste minimization programs.



2.1.4 Pollution Prevention Act of 1990

Facilities required to report releases for the Toxic Release Inventory (TRI) under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 must provide documentation of their procedures for preventing the release of or for reusing these materials. However, this act goes beyond wastes designated as hazardous. The intent is to force industries to reduce or prevent pollution at the source. In addition to source reduction, it also emphasizes reuse and closed loop recycling whenever possible. The emphasis is fundamentally different from off-site recycling,

treatment, and disposal as primary ways to handle waste. The Pollution Prevention Act (PPA) first established as comprehensive national policy the pollution protection hierarchy (see Figure 2-1).

2.2 STATE POLLUTION PREVENTION LEGISLATION

The Aberdeen Proving Ground (APG) P2 program responds to the following State of Maryland laws and regulations:

- *Maryland Recycling Act of 1988* requires each county with a population of more than 150,000 to develop a plan to reduce its solid waste by 20% through recycling.
- *Code of Maryland Regulation 08.13.03.04* requires that P2 information be maintained on coastal facilities.
- *Code of Maryland Regulation 26.08.03.07* requires that P2 activities be conducted in the event permit limits are exceeded (toxic release to surface waters) and that a petition be made to the Maryland Department of the Environment (MDE) requesting a temporary modification to a permit.
- *Code of Maryland Regulation 26.13.03.04* requires that generators who transport hazardous waste for off-site treatment, storage, or disposal prepare an approved manifest with waste minimization requirements.

MDE should be contacted for detailed information.

2.3 PRESIDENTIAL EXECUTIVE ORDERS

2.3.1 Executive Order 13101, "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition," September 1998

This EO requires federal agencies to implement acquisition programs aimed at procuring products that are environmentally preferable, energy efficient, and/or contain post-consumer recovered materials. This order supersedes EO 12873.

2.3.2 Executive Order 13123, "Greening the Government through Efficient Energy Management," June 1999

This EO establishes requirements intended to encourage efficient energy management in the federal government. This EO includes the following goals:

- Reduce greenhouse gas emissions from facility energy use 30% by 2010 from a 1990 baseline.
- Reduce facility energy consumption 30% per square foot by 2005 and 35% by 2010 from a 1985 baseline.
- For industrial and laboratory activities, reduce energy consumption 20% by 2005 and 25% by 2010 from a 1990 baseline.

2.3.3 Executive Order 13134 Biobased Products and Bioenergy, August 1999

This EO made it a national objective to triple the use of bioenergy and biotechnology by the year 2010. It is anticipated that meeting this objective will reduce greenhouse gas emissions by 100 million tons. Through the coordination of federal efforts, technology will be developed that converts trees, plants, and other organic material into energy, while petroleum-based products will be increasingly replaced.

2.3.4 Executive Order 13148, "Greening the Government Through Leadership in Environmental Management," April 2000

This EO establishes goals that involve establishing environmental management programs as well as goals that involve reaching measurable P2 milestones. P2 goals are as follows:

- Reduce TRI Form R releases 10% annually or 40% by December 31, 2006, from a baseline year of 2001. In addition to this reduction goal, note that this EO requires federal facilities to fully comply with the requirements of the EPCRA.
- Reduce the use of Environmental Protection Agency (EPA) priority chemicals 50% by December 31, 2006. The baseline year for the 50% reduction is 1991.
- Develop a plan to phase out the procurement of Class I ozone depleting substances (ODS) by December 31, 2010. The facility must develop this plan by April 3, 2001. Note that the Army established a goal to eliminate all ODS from each Army installation by December 31, 2003, and to develop the phase-out plan by September 30, 2000 (discussed further below).
- Develop a plan that addresses the facility's contribution toward achieving the goals in this EO. This plan must be developed by March 2002.
- Determine the feasibility of implementing a hazardous material pharmacy system at the facility. The facility must make this determination by April 2002.
- Institute environmentally and economically beneficial practices pertaining to landscaping activities. These practices must be based upon the Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds (60 Fed. Reg. 40837). Landscaping activities must conform to this guidance by October 2001.

By including many of the P2 elements of several previously existing executive orders, this EO revokes the following: EO12843 of April 1993, EO12856 of August 1993, EO12969 of August 1995, and section 1-4 "Pollution Control Plan" of EO12088 of October 1978.

2.3.5 Executive Order 13149, "Greening the Government Through Federal Fleet and Transportation Efficiency," April 2000

This EO establishes goals to improve the average fuel economy by increasing the use of alternative fuels for fleet vehicles. Note that this order exempts tactical military vehicles, law

enforcement vehicles, and emergency vehicles from its requirements. This EO supersedes EO 13031 of December 1996. This order established the following specific goals:

- Reduce vehicle petroleum consumption 20% by the end of FY 2005 from an FY 1999 baseline.
- Increase the average EPA fuel economy rating of cars and light trucks by at least 1 mile per gallon (mpg) by the end of FY 2002 and by 3 mpg by the end of 2005 from an FY 1999 baseline.
- Ensure that alternative fuels account for at least 50% of the fuels used in dual-fuel, alternative fuel vehicles.
- Ensure that at least 75% of car and light truck procurements are alternatively fueled vehicles.

2.3.6 Executive Order 13221 Energy-Efficient Standby Power Devices, July 2001

This EO encourages energy conservation by the federal government. This order charges each agency, when it purchases commercially available, off-the-shelf products that use external standby power devices or that contain an internal standby power function, to purchase products that use no more than one watt in their standby power consuming mode. If such products are not available, agencies shall purchase products with the lowest standby power wattage while in their standby power-consuming mode. Agencies shall adhere to these requirements, when life-cycle cost-effective and practicable and where the relevant product's utility and performance are not compromised as a result.

2.4 DEPARTMENT OF DEFENSE DIRECTIVES AND INSTRUCTIONS

2.4.1 Department of Defense Instruction 4715.4, "Pollution Prevention," June 1996

This document provides explicit guidance on P2 activities. It reiterates the P2 hierarchy principle, and establishes the DOD P2 measures-of-merit for TRI releases reduction, hazardous waste reduction, non-hazardous solid waste diversion, and alternatively fueled vehicles. Note that the TRI and hazardous waste reduction goals became obsolete on December 31, 1999. As a result, the DOD developed new measures of merit (see below).

2.4.2 Department of Defense Memorandum, "New DOD P2 Measure of Merit," May 1998

This memorandum establishes a new solid waste measure of merit to replace those in DOD Instruction 4715.4 (above). The new measure of merit is to "ensure that the diversion rate for non-hazardous solid waste is greater than 40% while ensuring integrated non-hazardous solid waste management programs provide an economic benefit when compared with disposal using landfilling and incineration alone." This goal is to be attained by the end of fiscal year (FY) 2005.

2.4.3 Memorandum, Assistant Secretary for Installations, Logistics, and Environment,
"Ozone-Depleting Chemicals (ODC) Elimination at Army Installations," February
13, 1996

With this memorandum, the Office of the Assistant Secretary of the Army for Installations, Logistics, and Environment established an Army wide goal to completely eliminate Class I ODS from all Army installations by December 31, 2003.

CHAPTER 3 INSTALLATION POLLUTION PREVENTION PROGRAM

3.1 POLICY

Aberdeen Proving Ground (APG) is committed to an active policy of protecting the environment through the following efforts:

- Reducing excessive purchasing and/or stocking of materials.
- Reducing the use of natural resources.
- Considering and using less polluting processes.
- Encouraging the use of environmentally preferable products.
- Maximizing reuse and recycling of materials.
- Ensuring the use of non-toxic, low-maintenance materials.
- Improving communication and training regarding pollution prevention (P2) initiatives.
- Complying with affirmative procurement requirements.

To accomplish these objectives, APG continuously identifies opportunities to reduce or eliminate pollution through source reduction and other prevention methods. This policy extends to all environmental media including hazardous waste, solid waste, air, water, and wastewater.

APG is committed to reducing the amount and toxicity of pollution that it generates. As part of this commitment, the installation gives priority to source reduction. Where source reduction is not feasible, APG will investigate and implement other prevention measures such as recycling, treatment, and controlled disposal.

Pollution prevention is the responsibility of everyone at APG.

3.2 POLLUTION PREVENTION MANAGEMENT STRUCTURE

APG manages its overall environmental program through a series of defined responsibilities. As an aspect of the environmental program, the installation also manages its P2 program in this manner. The various levels of responsibility for environmental management are as follows:

3.2.1 Command Level

With regards to the environmental program, installation command personnel are responsible for establishing overall policies, instituting regulations, and setting goals. In addition, they are responsible for establishing budgets and authorizing funding for the overall program and for specific projects. Command- and Directorate- level personnel stay involved in environmental activities primarily through regular meetings of the installation Environmental Quality Control Committee which meets once per quarter.

3.2.2 Primary Level

The installation environmental office maintains the principal responsibility for environmental oversight and management. The environmental office manage a number of environmental programs involving pollution prevention, hazardous waste, solid waste, air emissions, aboveground and underground storage tanks, etc.

3.2.3 Support Level

Organizations and personnel at this level furnish the environmental office with the resources and/or data required to manage environmental programs. Participants include the installation command staff and its directorates. Examples of support level activities include the Office of the Command Judge Advocate providing legal advice for permit registration, the Logistics Division overseeing hazardous material supply operations, the Directorate of Contracting providing policy and oversight for credit card hazardous material purchases, and the Safety Office maintaining environmental training records for installation personnel.

3.2.4 Task Level

This level consists mostly of installation and contracted organizations that provide specific work products. Examples include the various contractors and government personnel who operate the HAZMART, the Hazardous Inventory Tracking System, and the Treatment Storage Disposal Facility, as well as those who generate annual Tier II and Toxic Release Inventory reports.

3.2.5 Resource Level

Resources are typically regarded as various government and contractor personnel on post who have environmental training, experience, or knowledge and can contribute to specific aspects of environmental program management. Resources include those with extensive environmental knowledge such as environmental office personnel who are not directly responsible for a specific program but who may lend advice and assistance to that program's manager. Resources may also include personnel who serve in a limited environmental capacity such as those responsible for managing hazardous waste at research development and testing activities and industrial activities.

3.2.6 Operator Level

This level of personnel provide technical information to the primary level about the existing processes and the potential process changes to operations and waste generation activities. Examples include the Motor Pool personnel and Directorate of Installation Operations personnel.

3.3 BASELINE DEVELOPMENT

The baselines for the installation's P2 objectives are derived primarily from the pollution reduction goals established by "greening of the Government" executive orders and the Department of Defense (DOD) measures of merit. These baselines are based on the following metrics and are quantitatively identified in chapters 5-14 of this plan.

- Hazardous waste: Total disposed (pounds).

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- Solid waste: Percent of total generated diverted to recycling (percent).
 - Air emissions: Amount emitted (tons).
 - Water: Amount consumed (gallons).
 - Wastewater: Amount generated (gallons).
 - Toxic Release Inventory Form R chemical releases: Releases and off-site transfers (pounds).
 - Environmental Protection Agency priority chemicals: Purchases of individual target chemicals (pounds).
 - Ozone depleting substances (ODS): Total inventory (pounds).
 - Vehicle fuel use: Amount of petroleum consumed (gallons).
 - Amount of alternative fuel consumed (gallons).
 - Energy: Electricity used (kWh) per total square feet of installation facilities.
 - Alternatively-fueled vehicles: number of vehicles leased/procured.

3.4 OPPORTUNITY ASSESSMENTS

When reduction requirements are determined, options for meeting the requirements must be identified through pollution prevention opportunity assessments (PPOAs). PPOAs examine current processes and identify and evaluate alternatives for pollution prevention. Projects identified by PPOAs must have the data necessary to show the cost benefit of the project.

A PPOA examines all input sources, material usage, and waste generation by type and weight, and determines practical and economical options for reduction. This generally involves examining each process involving a targeted substance to determine ways to avoid use or minimize generation of that substance. Detailed baseline information characterizing material use and waste streams for each process may be gathered concurrently with the assessment process. PPOAs may be performed by trained post level or command personnel or by contractors and, to be effective, must involve of process-level personnel.

3.5 POLLUTION PREVENTION GOALS

Chapters 5-14 of this plan describe the installation's P2 goals with respect to each environmental media area, environmental laws, EOs, and DOD policies.

3.6 IMPLEMENTATION AND EVALUATION

This section describes some of the methods and tools the installation uses to track and document its environmental efforts such as P2 projects and initiatives.

3.6.1 Environmental Quality Report

This report is part of an automated system used to collect a wide variety of installation environmental information, including compliance, conservation, program management, and P2 actions. The primary goal of the Environmental Quality Report (EQR) is to provide DOD with the information it requires as well as to provide Headquarters Department of Army, command, major subordinate commands, and installations with critical management information while minimizing short suspense tasking to installation personnel. Data in the EQR respond to the the requirement of the 1996 Defense Environmental Quality Program Annual Report to Congress, the DOD RCS DD-A&T (A) 1997, and other laws and regulations intended to update EQR users and federal policy makers on the Army's environmental programs. The EQR is the source of data for annual EQRs to Congress, semi-annual EQRs to the DOD, quarterly reports for the Quarterly Army Performance Review, Command Environmental Quality In-Process Reviews, Installation Management Steering Committee meetings; and semi-annual EO reports to the command.

3.6.2 Army Environmental Program Requirements

Installation personnel use the Environmental Program Requirements database to plan, program, budget and forecast costs to manage the environment; to practice good environmental stewardship; and to attain and maintain compliance with existing and pending federal, state, and local environmental laws and regulations. It is used to show past expenditures, to track project execution and performance, to refine and validate requirements for the budget year, and to plan and program requirements and resources in the out-years.

3.6.3 Environmental Performance Assessment System

The Environmental Performance Assessment System (EPAS) is an Army wide program that documents an installation's compliance status on a three-year cycle. As a component of the EPAS, assessors evaluate the installation's P2 program in terms of its compliance with many of the directives and EOs described in Chapter 2. This evaluation is included as part of the Environmental Performance Assessment Report (EPAR). After each installation environmental performance assessment, the assessors write an EPAR and provide copies to the installation and its command. The installation then works with the command to develop the Installation Corrective Action Plan (ICAP). Developing the ICAP is an opportunity to consider and plan for P2 projects that can help achieve and maintain compliance.

3.7 REPORTING REQUIREMENTS

The installation has the following P2 reporting requirements:

- Hazardous waste generator biennial or annual report (from Resource Conservation and Recovery Act).
- EQR hazardous waste disposal and recycling roll-ups (from AR 200-1).

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- EPR of programming, budgeting, and execution for all environmental projects, including P2 (from AR 200-1).
 - ODS procurement approvals and determinations (from section 326 of the National Defense Authorization Act for FY93).
 - Solid Waste Annual Report.
 - Installation Status Report Part II.
 - Emergency Planning and Community Right to Know Act Tier I/II Reports.

3.8 POLLUTION PREVENTION PROJECT FUNDING

P2 projects are funded from the appropriate account of the proponent's operating budget.

CHAPTER 4 COMPLIANCE THROUGH POLLUTION PREVENTION

4.1 DESCRIPTION OF COMPLIANCE THROUGH POLLUTION PREVENTION

Pollution Prevention (P2) is an effective tool that Aberdeen Proving Ground (APG) uses to reduce its compliance burden, improving compliance status. This section represents APG's efforts to categorize and document its compliance benefit.

A compliance site is a facility or process that falls under environmental regulation. A single area may have multiple compliance sites associated with it. For example, an industrial process may have a wastewater discharge point, permitted air emission sources, and a hazardous waste storage area. Some examples of compliance sites include permitted air emission sources, hazardous waste storage areas, regulated storage tanks, landfills, OB/OD areas, etc.

Compliance thresholds are quantitative limits that trigger environmental compliance requirements once they are exceeded. An examples of a compliance threshold includes the waste generation limits for determining hazardous waste generator status (greater than 1,000 Kg/mo is large quantity, less than 1,000 but greater than 100 kg/mo is small quantity, and less than 100 Kg/mo is conditionally exempt small quantity). Another example is the limit for Toxic Release Inventory (TRI) reporting. Facilities that use more than 10,000 lbs of a TRI chemical in a year must include that chemical in its TRI Form R report.

4.2 COMPLIANCE SITES

4.2.1 Hazardous Waste Storage Facilities

Quantity of Hazardous Waste Storage Areas. This table shows the progress that APG has made in reducing its number of hazardous waste compliance sites.

Table 4-1 Quantity of hazardous waste storage areas

Facility Type	Quantity				
	1999	2000	2001	2002	2003
Satellite	350	350	300	250	199

4.2.2 Initiatives to Reduce the Number of Areas.

Education

Training

Pollution prevention

Environmentally preferable purchasing

Hazardous waste minimization

Use of alternative technologies where feasible

4.2.3 Permitted Air Emission Sources

2 Title V Permits

4.2.4 Permitted Solid Waste Disposal Facilities

Phillips Landfill Refuse Disposal

1500 scrap tires at Building 3929

50 scarp tires at Building 2379

4.3 COMPLIANCE THRESHOLDS

4.3.1 Hazardous Waste Thresholds

From 2002-2003, APG generated 4,610,472 lbs of hazardous waste. Hence, it is considered a large-quantity hazardous waste generator.

4.3.2 Toxic Release Inventory Thresholds

Table 4-2 **TRI Form R Releases**
(Total pounds released per calendar year)

TRI Form R Chemical	Baseline 2001	2002	2003	Target
Lead	2,583.0	1,319.0	4,223.1	1,033.2
Mercury	-	-	83.4	0

4.4 DESCRIPTION OF FORM R RELEASES

Lead

2001

- 1,848.0 lbs from range munitions activities
- 604.2 lbs lead-contaminated debris hazardous waste from building demolition activities
- 96.7 lbs lead-contaminated bullet trap rubber hazardous waste from range training activities
- 25.0 lbs lead-contaminated hazardous waste from expired shelf-life turn-ins
- 4.8 lbs wastewater treatment lead-contaminated hazardous waste sludge
- 2.7 lbs lead-contaminated soils hazardous waste from Comprehensive Environmental Response, compensation, and Liability Act activities
- 1.5 lbs lead-contaminated hazardous waste sludge from one-time tank cleaning activities
- 0.1 lbs lead-contaminated hazardous waste from depainting activities

2002

- 858.0 lbs from range munitions activities
- 443.1 lbs lead-contaminated debris hazardous waste from building deconstruction activities
- 17.0 lbs lead-contaminated hazardous waste from expired shelf-life turn-ins
- 0.5 lbs lead-contaminated sand from range training activities
- 0.4 lbs lead-contaminated hazardous waste from depainting activities

2003

- 4,167.2 lbs from range munitions activities
- 45.8 lbs lead-contaminated debris hazardous waste from building deconstruction activities
- 7.5 lbs lead-contaminated hazardous waste from expired shelf-life turn-ins
- 1.9 lbs depainting sludge hazardous waste from the Ordnance Center and School paint booths (Buildings 5014 and 5045)
- 0.7 lbs from routine clean-up (floor sweepings) hazardous waste from the Army Research Laboratory

Mercury**2003**

- 83.4 lbs from laboratory-generated hazardous waste

4.4.1 Environmental Protection Agency Priority Chemical Thresholds

See Appendix J.

CHAPTER 5 HAZARDOUS AND INDUSTRIAL WASTE

5.1 PREVENTION GOAL

The Aberdeen Proving Ground (APG) hazardous and industrial waste reduction goal is to show a continuous annual reduction in the overall disposal of these wastes. For the purposes of this plan, hazardous wastes include all wastes that fall under an Environmental Protection Agency (EPA) hazardous waste code and that require a hazardous waste manifest for disposal. Industrial wastes represent wastes that are not always considered hazardous under Resource Conservation and Recovery Act (RCRA) but must be managed separately from municipal solid wastes. Regulated waste is hazardous, while non-regulated waste can be either non-hazardous or industrial waste. Examples of regulated hazardous wastes generated by APG are contaminated used oil, contaminated spent antifreeze, and aerosol can residue. Major universal waste streams include lead-acid batteries, fluorescent light bulbs, computers and computer monitors, and non-contaminated antifreeze.

Hazardous waste management remains a key compliance issue, subjecting the command to enforcement actions and future liabilities as well as diverting a significant portion of resources for the management of those wastes. The quantity of hazardous waste disposed is a common, though misleading, indicator of the performance of pollution prevention (P2) programs. APG monitors and reports annually the quantity (pounds) of hazardous waste disposed off-site. However, APG undertakes efforts to reduce the quantity of waste generated and implement on-site measures to recycle or reuse the waste.

APG's program goals include reducing the use of Executive Order (EO) 13148 toxic chemicals and hazardous substances and other pollutants. Pursuant to EO13148, EPA identified a list of priority chemicals used by the federal government in applications and for purposes that may result in significant harm to human health or the environment. A baseline was established in 2002.

5.2 BASELINE AND PROGRESS

Table 5-1 **Hazardous waste**

(pounds disposed per calendar year)

Baseline						Target: Continuous Reduction
1999	2000	2001	2002	2003	2006	
595,396	543,466	585,323	485,530	4,610,472	-	

Table 5-2 **Non-Hazardous industrial waste**

(pounds disposed per calendar year)

Baseline						Target: Continuous Reduction
1999	2000	2001	2002	2003	2006	
19447	19608	5964	3996	8392	-	

5.3 DESCRIPTION OF MAJOR WASTE-GENERATING ACTIVITIES

- Research, development, testing and evaluation facilities: Includes traditional science laboratories, indoor and outdoor firing ranges, test ponds and off-road vehicles tracks.
- Training and unit exercises: Includes activities that would occur during routine training
- Exercises: Includes battery replacement in small, battery-operated equipment such as radios and flashlights.
- Biological weapons systems, training exercises, decontaminating equipment and gear, and replacing gas mask filters.
- Weapons cleaning and repair: Includes cleaning, lubricating, and preserving weaponry. Weapons may be cleaned at unit locations during routine training exercises and may be repaired at a Small Arms Repair Shop. Weapons cleaning may generate rags and swabs contaminated with cleaning solvent and metal particulates.
- Fueling operations: Includes refueling of equipment, surface vehicles and aircraft using fuels stored on-site or contracted from vendors. May include any operation associated with vehicle fueling, on-site fuel supplies, and storing fuel or vehicles containing fuel. Fueling operations may result in the spill of fuels from vehicles.
- Vehicle and aircraft washing: Includes surface vehicle and airframe washing using either hot or cold water, with or without detergent. May be performed at facilities equipped with oil/water separators or at commercial car washes. Also includes engine cleaning.
- Oil changes: Includes all routine oil replacement conducted on surface vehicles and equipment (excluding brake fluids, hydraulic fluids, and transmission fluids).
- Brake maintenance: Includes routine brake maintenance and repair, such as replacing hydraulic fluid, brake shoes and brake pads. Brake shoes and pads may contain asbestos.
- Tire maintenance: Includes replacing worn surface vehicle or aircraft tires.
- Battery maintenance: Includes any activity involving servicing or replacing surface vehicle or aircraft batteries. Also includes replacing batteries in small equipment. It may result in waste batteries, recyclable batteries, or batteries turned in on a 1-for-1 exchange.
- Radiator flushing: Includes replacing spent antifreeze and treating corrosion in surface vehicle radiators.
- Parts washing: Includes cleaning and degreasing mechanical components during routine maintenance or repair. Can be done using various techniques such as steam, solvents, acids, bases, detergents, or hot water.

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- Mechanical work: Includes any mechanical component repair (other than brakes, tires, batteries, radiators or parts washing), such as engine overhauling or aircraft turbine repair, drive train work, or transmission overhauls. May be performed on surface vehicles and equipment or aircraft.
 - Large-scale painting: Includes high-volume painting on surface vehicles and equipment and aircrafts. Usually done in a paint booth equipped with a wet- or dry- filter system. Paint is applied via spray paint guns or aerosol cans.
 - Spot painting: Includes touch-up painting, corrosion control, and stenciling on surface vehicles, aircraft, and miscellaneous equipment. Minimal quantities of paint are used and may be applied by brushes or aerosol cans.
 - Metal fabrication: Includes manufacturing and/or modifying sheet metal for vehicles and aircraft frames and cutting, machining, and welding metal parts.
 - Electronics maintenance: Includes testing, cleaning, repairing, or replacing electronic components, such as circuit boards. Components are often cleaned with solvents or environmentally friendly chemicals such as denatured alcohol.
 - Shop and spill cleanup: Includes routine shop cleanup measures or emergency and non-emergency spill cleanup measures.
 - Facility building maintenance: Includes repair and routine maintenance of building interiors and exteriors, janitorial work, cleaning and waxing floors, carpentry work, plumbing, electrical repairs, fluorescent light bulb and ballast replacement, and facility painting. May also include performing structural repairs as needed.
 - Building equipment maintenance: Includes maintaining and repairing plant equipment such as boilers.
 - Pest management: Includes pest control measures for facilities and buildings.
 - Grounds maintenance: Includes maintaining facility grounds through activities such as landscaping, mowing, and mulching.
 - Procurement operations: Includes shipping, receiving and warehousing purchased materials.

5.4 CURRENT POLLUTION PREVENTION INITIATIVES

5.4.1 Solvent Reduction in Cleaning and Degreasing

Army Research Laboratory (ARL), Aberdeen Test Center (ATC), and the garrison all use aqueous parts washers for degreasing (see Figure 5-1). In addition, the Ordnance Center and School (OC&S) uses gun-washing units that recycle and reuse cleaning solvent. APG targets solvent degreasers for elimination wherever feasible. There are more than 15 aqueous parts washers on the installation, reducing worker exposure to harmful solvents and reducing volatile emissions to the air. Garrison and tenant organizations use aqueous parts washers for vehicle and

equipment maintenance and small arms cleaning to reduce costs as well as adverse effects on human health and the environment.

This process modification and subsequent material substitution has eliminated the use and disposal of thousands of gallons of halogenated and nonhalogenated solvents used for degreasing. These types of solvents volatilize and contribute to the formation of ground-level ozone. Further, long-term exposure can cause dermatitis and, more seriously, central nervous system and brain damage.



Figure 5-1 An aqueous parts washer being used by a Directorate of Logistics contractor.

5.4.2 Other Pollution Prevention Initiatives

The APG P2 Policy reduces the generation of hazardous and industrial wastes. Specifically, the P2 Policy calls for the reduction of excessive purchasing and/or stocking of materials (hazardous or otherwise); reducing the use of natural resources (such as fuels), considering and using less polluting processes; improving communication and training regarding P2 initiatives; encouraging the use of environmentally preferable products; maximizing the reuse and recycling of materials (hazardous or otherwise); and

ensuring the use of non-toxic, low maintenance materials.

The APG Hazardous Materials Management Policy reduces the generation of hazardous and industrial wastes. By maintaining an automated inventory, the Hazardous Inventory Tracking System (HITS), the installation is able to track the locations and quantities of all hazardous chemicals, including Toxics Release Inventory (TRI)/Tier II listed chemicals. This system is used to target areas for material reductions/eliminations.

The APG Environmentally Preferred Paint Policy reduces the generation of hazardous and industrial wastes. This policy directs all APG personnel to purchase only those architectural coatings that meet the environmental standard set forth in the policy. This policy reduces the amount of hazardous waste generated by painting.

The APG Green Building Policy reduces the generation of hazardous and industrial wastes. This policy directs all APG personnel and contractors responsible for capital projects on the installation to: prevent pollution in all project stages; conserve natural resources; minimize adverse effects on biological and human environments; and maximize recycling and waste minimization.

The APG Environmentally Preferable Product and Affirmative Procurement Policy reduces the generation of hazardous and industrial wastes. This policy requires that all APG personnel increase the acquisition of environmentally preferable products and services, unless written

justification is provided to the Directorate of Safety, Health and Environment. This policy also encourages all APG personnel to attend environmentally preferable purchasing training.

ATC is participating in a closed-loop battery recycling program. Under this program, used automotive batteries are palletized and removed to be recycled. This eliminates the manual addition of battery acid and all waste components associated with batteries. Exide Battery provides new batteries made with recycled lead and removes old batteries for recycling. Prior to this arrangement, batteries were purchased from various sources, and old batteries were disposed of as hazardous waste. This program is expected to save \$8,000 per year.

ATC returns all tanks of CO, CO₂, NO, NO₂, NH₃, and some fire suppressant gases to the manufacturer, eliminating any disposal of gases or tanks.

ATC use of a mobile x-ray truck has eliminated all development labs on the ATC main front and has eliminated the need for the Edgewood Area development lab.

ATC uses digital x-rays in 90 percent of tests, eliminating the need for hazardous development chemicals. ATC has reduced x-ray chemical purchases 50 percent through facility consolidation and improved inventory management.

ATC captures silver generated by the x-ray development process in a silver recovery unit and the recovered silver is taken to the Fort Meade Defense Reutilization and Marketing Office for resale.

ATC purchased an antifreeze-recycling machine to filter and recharge used antifreeze, eliminating the disposal of used antifreeze and the purchase of new antifreeze. This saves approximately \$15,350 per year.

ATC reuses chemicals that are used in lab processes until they are completely spent, reducing hazardous waste disposal and new chemical purchases.

ATC returns fuels being tested (i.e., diesel) to users for use rather than being disposed of as hazardous waste.

ATC recycles and reuses fixer used in x-ray development, saving money on disposal and new product purchase.

ATC purchases remanufactured toner cartridges and returns old cartridges for remanufacturing. This saves \$9,500 to \$10,000 per year.

ARL recycled 40,000 pounds of fuel through the DRMO.

ARL implemented the use of digital photography and pixel ray to replace wet chemical film and x-ray development where feasible. This eliminated the many costs of these antiquated technologies, including the use and disposal of hazardous materials, water, waste film, the disposal of silver waste and labor time. ARL facilities that still use traditional wet-processing photography and x-ray reuse fixer to reduce the amount of fixer used.

ARL facilities use water-based cleaners for parts washing and paint gun cleaning.

ARL labs and testing facilities employ micro-scale chemistry techniques in lieu of large-scale experiments where feasible.

ARL facility maintenance crews substitute water-based paints and primers for solvent-based, including latex aerosol spray paints containing less chemicals and no Toxics Release Inventory Chemicals.

ARL, ATC, and Garrison large scale painting operations employ High Volume Low Pressure paint spray systems to increase paint transfer efficiency.

ARL firing ranges have replaced lead rounds with tungsten rounds in weapons.

ARL has reduced its hazardous materials inventory by 20% through an aggressive opportunity assessment effort in 2002. Testing facilities voluntarily eliminated stagnant inventories of hazardous materials. ARL conducts regular PPOAs of its largest waste-generating facilities. Through these assessments, recommendations are made and implemented to continuously prevent pollution.

The Center for Health Promotion and Preventative Medicine (CHPPM), to reduce turn-in of excess chemicals in laboratory and animal testing, orders only the smallest quantity deemed necessary.

CHPPM returns excess products received for toxicological testing to the manufacturer for disposal whenever possible.

The Dental Clinic (DENTAC) installed silver recovery systems to capture the silver discharged during film processing. This new equipment not only saves workspace in the dark room but also eliminates the need for personnel to transport five-gallon drums of wastewater in a government vehicle to a satellite accumulation site for storage. Because of the recovery systems, DENTAC can now discharge waste into the sanitary sewer.

Directorate of Logistics, Engineering/Documentation System Incorporated, and the OC&S, launder and reuse some rags used

in vehicle maintenance (see Figure 5-2). The oils recovered from the laundering process are reused for fuel, and the generation of hazardous waste from rag disposal is avoided.

Edgewood Chemical and Biological Command (ECBC) purchased new digital imaging equipment to eliminate wetphoto processing from the Microland's electron microscope operation. This eliminates the generation of waste fixers and developing solutions. ECBC estimated a 650-pound reduction in hazardous waste fixer in calendar year 2000.



Figure 5-2 Some Aberdeen Proving Ground Activities recover oil from used rags.

ECBC is phasing out its use of mercury thermometers in analytical laboratories. The mercury thermometers periodically break, sometimes generating large quantities of hazardous wastes. This project is expected to save ECBC approximately \$250 in disposal costs and eliminate a 50-pound-per-year waste stream.

ECBC has replaced a paraffin/wax mixture with a nontoxic, water-soluble adhesive. This substitute has eliminated a 17,000-pound-per-year waste stream. It also saves approximately \$11,400 per year by eliminating the costs for disposal, drums, administration, training, and storage. Previously this waste stream had to be disposed of commercially, but now it is discharged to the sanitary sewer.

5.5 POTENTIAL POLLUTION PREVENTION INITIATIVES

Continue material elimination or substitution, equipment modification, and process improvements as identified through pollution prevention opportunity assessments.

Provide the cashiers and store managers at the Office Eagles with HITS access. Logging materials out of the Office Eagle inventory at the time of purchase would improve the accuracy of the hazardous materials inventory. Additionally, having local access to HITS would allow the store managers to better manage their environmentally preferable purchasing as well as monitor their inventory for expired and soon to be expired items.

CHAPTER 6 SOLID WASTE

6.1.1 Prevention Goal

Ensure that the diversion rate for non-hazardous solid waste is greater than 40% by the end of Fiscal Year (FY) 2005.

The quantity of solid waste disposed is a general indicator of the performance of the pollution prevention (P2) program. The solid waste diversion rate is the rate at which non-hazardous solid waste is diverted from entering a disposal facility. Disposal facilities include landfills and incinerators. Composting, mulching, recycling, reuse, and donation are generally accepted diversion methods.

Solid waste is generated from various sources on Aberdeen Proving Ground (APG) locations such as administrative offices, commercial areas, industrial shops, and technical directorates. Refuse collection at APG, with the exception of refuse generated by construction contracts, is typically performed by contract. Installation resource recovery and recycling programs and the Defense Reutilization and Marketing Office (DRMO) are two principal methods with which to manage the collection and sale of recyclable and reusable materials. While solid waste disposal costs are not borne by the environmental program, and only certain aspects of recycling programs are eligible, APG encourages P2 approaches to solid waste management.

6.1.2 Baseline and Progress

Note that this goal does not have a baseline amount. This is because the 40% diversion rate represents 40% of the total amount of solid waste generated in 2005 and is independent of previous years' diversion amounts.

Table 6-1 **Solid Waste**
(percentage diverted from disposal to recycling)

					Target: 40%
1999	2000	2001	2002	2003	2005
19%	9%	36%	57%	27%	-

6.2 DESCRIPTION OF MAJOR SOLID WASTE STREAMS

Major solid waste-generating activities at APG include: scrap metal, tires, cardboard, scrap wood, paper, construction and demolition debris, food waste and aerosol cans (see Table 6-1).

Table 6-1 **Aberdeen Proving Ground's major solid waste streams.**

Bulky Items	appliances, computers, machinery, wood pallets, construction/demolition debris
Cardboard	boxes, packaging materials
Metal	food/beverage containers, machine parts
Paper	newspaper, office paper, paper products
Organic Matter	food waste, grass clippings, brush
Special Wastes	vehicle fluids, tires, sludge

6.3 CURRENT POLLUTION PREVENTION INITIATIVES

6.3.1 Deconstruction of Ship Engines

Demolishing older, deteriorating, and temporary buildings is required to allow space for the construction of new buildings. However, demolition is costly and it generates a lot of heavy solid waste. Therefore, whenever feasible, Directorate of Installation Operations (DIO) and the Directorate of Safety, Health and Environment (DSHE) first consider deconstruction as an alternative to demolition. Deconstruction is the dismantling of a building in the opposite manner in which it was constructed so that component parts may be segregated and reused. In some situations, deconstruction includes the reuse of a structure without having to first dismantle it. In the fall of 2001, the P2 Program began searching for groups that might be interested in deconstructing two large five-cylinder diesel engines located in a building slated for demolition (see Figure 6-1). The engines were built in 1918 and were used to power large ships. When APG received them, they were first used as a main source of electrical power for a limited area of the Installation and later as a backup power source. They have not been operated in 20 years.



Figure 6-1 Two large ship engines that were deconstructed.

After exploring several options, the P2 Program established a contract with the Shenandoah Valley Steam and Gas Engine Association to deconstruct the engines. Members of the association, which has been in existence since 1959, clean, reconstruct, and display antique steam and gas engines at shows and fairs year-round.

6.3.2 Other Pollution Prevention Initiatives

The APG P2 Policy reduces the generation of air emissions. Specifically, the P2 Policy calls for the reduction of excessive purchasing and/or stocking of materials (hazardous or otherwise); reducing the use of natural resources (such as fuels), considering and using less polluting processes; improving communication and training regarding pollution prevention initiatives; encouraging the use of environmentally preferable products; maximizing the reuse and recycling of materials (hazardous or otherwise); and ensuring the use of non-toxic, low maintenance materials. Compliance with all of these requirements reduces the generation of solid, hazardous, water and air pollution.

The APG Hazardous Materials Management Policy reduces the generation of air emissions. By maintaining an automated inventory, the Hazardous Inventory Tracking System (HITS), the installation is able to track the locations and quantities of all hazardous chemicals, including Toxics Release Inventory (TRI)/Tier II listed chemicals. This system is used to target areas for material reductions/eliminations. Most of these chemicals create an air emission (fugitive or otherwise) when generated or used. Compliance with this policy reduces the generation of hazardous, water and air pollution.

The APG Environmentally Preferred Paint Policy reduces the generation of air emissions. This policy directs all APG personnel to purchase only those architectural coatings that meet the environmental standard set forth in the policy. This policy reduces the amount of volatile organic compounds emitted by paint.

The APG Green Building Policy reduces the generation of air emissions. This policy directs all APG personnel and contractors responsible for capital projects on the installation to: prevent pollution in all project stages; conserve natural resources; minimize adverse effects on biological and human environments; mitigate adverse air quality effects on the atmosphere as well as the indoor environment; and maximize energy efficiency and use of renewable energy sources.

The APG Environmentally Preferable Product and Affirmative Procurement Policy reduces the generation of air emissions. This policy requires that all APG personnel increase the acquisition of environmentally preferable products and services, unless written justification is provided to the DSHE. This policy also encourages all APG personnel to attend environmentally preferable purchasing training.

The APG P2 Program has reduced the paper waste and saved resources by incorporating applicable documents by reference in the 2004 APG P2 Plan.

Army Research Laboratory (ARL) facilities recycle scrap metal.

ARL facilities recycle lead-acid batteries.

ARL employees have replaced aerosols with pump spray products, including Spray Nine, Grez Off, WD-40, Glass Plus, and insect repellents where feasible.

Aberdeen Test Center (ATC) uses retread tires on commercial vehicles. Prior to this program, only new tires were used, and all old tires were disposed of through an APG Garrison contract. Now old tires are turned in for recapping. This saves approximately \$794.16 per year.

ATC, Bldg. 402 automotive maintenance shop began use of ShopSolv solvent in air-charged sprayers rather than individual purchase in 18 oz. aerosol cans (see Figure 6-2). ShopSolv



Figure 6-2 Compressed air sprayers and citrus based cleaners replace aerosol solvents for cleaning and degreasing.

solvent is purchased in 55 Gal. drums and dispensed to hand-held air charged sprayers. This has resulted in a reduction of 2 55 gal. drums of aerosol cans per month, and a capital and operating cost reduction of \$590/6 months. The procurement & waste disposal costs avoided are \$300/month, with an estimated payback of 2 months, totaling an annual savings of \$2,400.

The Directorate of Logistics equipment maintenance contractor, Engineering Documentation Systems, Inc., has significantly reduced reliance on aerosol cans for nearly 300 products without impacting operations.

6.4 POTENTIAL POLLUTION PREVENTION INITIATIVES

Continue material substitutions, equipment modifications, and process improvements as identified

through pollution prevention opportunity assessments.

Replace disposable radio batteries with rechargeable nickel-cadmium substitutes.

Make it a standard practice to have all printers automatically set to double-sided printing without a banner sheet.

CHAPTER 7 AIR EMISSIONS

7.1.1 Prevention Goal

Aberdeen Proving Ground's (APG's) goal is to show a continuous annual reduction in air emissions.

Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) requires annual reporting of releases of toxic chemicals. All installations that manufacture, process, or otherwise use quantities of a toxic chemical in excess of a reporting threshold must annually submit a Form R to the Environmental Protection Agency (EPA). Those reports also are submitted through the chain of command for tracking. The Department of Defense (DOD) uses the quantity of toxic chemicals released as a general indicator of the performance of its pollution prevention (P2) programs.

Some APG locations have multiple air emissions sources that are subject to regulation. Examples include boilers, generators, surface coating operations, degreasing operations, painting, welding operations, etc. As emissions restrictions tighten with implementation of Clean Air Act standards for hazardous air pollutants and specific industries, APG faces increasing challenges to meet those standards while continuing to perform its mission functions.

7.1.2 Baseline and Progress

Table 7-1 Air Emissions
(Tons emitted per calendar year)

		Target: Continuous Reduction
Pollutant	2003	2005
PM ₁₀	14.14	-
SO ₂	68.5	-
CO	31.5	-
VOCs	11.57	-
HAPs	2.76	-

7.2 DESCRIPTION OF MAJOR EMISSION SOURCES

The major sources of emissions at APG include, paint booths, underground storage tanks, demilitarization operations, testing facilities/ranges, and boilers.

7.3 CURRENT POLLUTION PREVENTION INITIATIVES

7.3.1 Environmentally Preferable Paint Study

In 1998 APG conducted an Environmentally Preferable Paint Study. Paint products can be a source of hazards. These hazards arise from the presence of high volatile organic compound (VOC) levels and inorganic and organic compounds.

VOCs, which evaporate easily into the air, contribute to ground-level ozone formation. While ozone in the stratosphere protects the earth from harmful ultraviolet rays, ozone at ground level can be harmful to breathe. Ground-level ozone forms when VOCs react with other pollutants called nitrogen oxides (NO_x) in sunlight, causing ozone levels to usually be higher on hot, sunny days. High concentrations of ground-level ozone cause shortness of breath, coughing, wheezing, headaches, nausea, and eye and throat irritation. People who suffer from lung diseases such as emphysema, bronchitis, pneumonia, asthma, and colds have even more trouble breathing when air is polluted. These effects can be worse in children, the elderly, and exercising adults. Ozone may increase the susceptibility of the lungs to infections, allergens, and other pollutants. Medical studies have shown that ozone damages lung tissue and that harmful effects may continue after exposure ends. Ozone can also damage plants as well as materials, such as rubber, and structures such as bridges.

Organic compounds also pose a health hazard. For example, benzene is one of the organic compounds in some paint. Benzene is a known human carcinogen. It also has an accelerated photochemical reaction when in the presence of typical atmospheric pollutants such as nitrogen oxides and sulfur dioxide.

APG has set stringent standards for each of these substances. Table 7-2 shows the APG VOC limits for paints.

Table 7-2 APG VOC Limits for Paints

Type of Paint	VOCs(grams/liter)	VOCs(pounds/gallon)
Interior architectural		
Flat	50 g/l	0.42 lb/gal
Non-Flat	150 g/l	1.25 lb/gal
Exterior architectural		
Flat	100 g/l	0.83 lb/gal
Non-Flat	200 g/l	1.66 lb/gal
Anticorrosive		
Flat	250 g/l	2.10 lb/gal
Semi-Gloss	250 g/l	2.10 lb/gal
Gloss	250 g/l	2.10 lb/gal

Paints often contain inorganic and organo-metallic components used as preservatives, additives, and pigments. APG standards prohibit the use of these base inorganic components (see Table 7-3).

Table 7-3 Inorganic Components Prohibited by APG Standards for Paints

Inorganic Components
Antimony
Cadmium
Hexavalent chromium
Lead
Mercury

APG standards also prohibit the use of some organic chemical compounds. Table 7-4 lists all compounds prohibited by APG standards.

Table 7-4 Organic Compounds Prohibited by APG Standards for Paints

Prohibited Organic Compounds	
Methylene chloride	Di-n-butyl phthalate
1,1,1-trichloroethane	Di-n-octyl phthalate
Benzene	Diethyl phthalate
Toluene (methylbenzene)	Dimethyl phthalate
Ethylbenzene	Isophorone
Vinyl chloride	Formaldehyde
Naphthalene	Methyl ethyl ketone
1,2-dichlorobenzene	Methyl isobutyl ketone
Di (2-ethylhexyl) phthalate	Acrolein
Butyl benzyl phthalate	Acrylonitrile

APG's standards are similar to Green Seal's publicly set Standard for Architectural Paint, GS-11. Green Seal is a nonprofit environmental standard-setting organization. Reaching outside the installation boundary to a publicly acclaimed entity, APG contracted with Green Seal to identify environmentally responsible paints.

Green Seal reviewed Material Safety Data Sheets (MSDS) to identify those that did not comply with APG's paint standards. Paints that were found to contain no prohibited compounds were then tested for VOCs by Aberdeen Test Center (ATC). ATC used EPA Reference Test Method 24, *Determination on Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coatings, CFR Title 40, Part 60 Appendix A*. Paints that met the content standards and passed VOC tests were recommended to APG purchasers as choices that minimize adverse effects on human health and the environment. Of the 565 paints examined, 107 appeared to meet APG standards and were tested for VOC levels by the ATC. Table 4 summarizes the results of the paint evaluation.

Table 4. Summary of Paint Evaluation Results

Element	Quantity
Paints evaluated	565
Paints eliminated by ingredients or VOCs	351
Paints out of business, no longer made, or unavailable	107
Paints tested for VOC levels	107
Paints approved	71

Seventy-one paints in the original study were identified as environmentally preferred and included flat, semi-gloss, and gloss finishes for interior and exterior applications. Since these paints are manufactured by several different manufacturers, competitive purchasing is not a challenge.

To encourage the use of environmentally preferred paints (see Figure 7-1), APG has implemented a policy to ensure that its employees and contractors use only paints that meet the APG standards in all architectural applications or that they justify the use of noncompliant paints. The study was limited to architectural and anti-corrosive paints, the paint categories

most commonly used at APG. To simplify purchasing decisions, all APG paint buyers have received a list of examples of paints that meet the standards. This list is periodically updated and posted on the P2 Program's website (<http://www.apg.army.mil/ap2g/index.htm>). Over 200 paints have been identified so far as meeting or exceeding the APG Paint Standard.

APG is measuring the success of the program, using the Hazardous Inventory Tracking System (HITS). Based on initial results, APG anticipates saving an average of \$1.76 per gallon of paint purchased.

David Kling, director of the EPA's P2 Division, applauded APG's efforts in the following excerpt:

"The body of knowledge you are contributing to will help guide environmentally preferable purchasing as it evolves into a mature and practical tool for protecting human health and the environment without relying on costly and burdensome regulations... We look forward to a continued relationship with you and your staff to be sure your current and future efforts in this arena are shared for the benefit of others to learn from and replicate."



Figure 7-1 A paint that meets the Aberdeen Proving Ground Environmentally Preferable Paint Standard displays the Pollution Prevention Program Label.

7.3.2 Other Pollution Prevention Initiatives

The APG P2 Policy reduces the generation of air emissions. Specifically, the P2 Policy calls for the reduction of excessive purchasing and/or stocking of materials (hazardous or otherwise); reducing the use of natural resources (such as fuels), considering and using less polluting processes; improving communication and training regarding pollution prevention initiatives; encouraging the use of environmentally preferable products; maximizing the reuse and recycling of materials (hazardous or otherwise); and ensuring the use of non-toxic, low maintenance materials. Compliance with all of these requirements reduces the generation of solid, hazardous, water and air pollution.

The APG Hazardous Materials Management Policy reduces the generation of air emissions. By maintaining an automated inventory, the Hazardous Inventory Tracking System (HITS), the installation is able to track the locations and quantities of all hazardous chemicals, including Toxics Release Inventory (TRI)/Tier II listed chemicals. This system is used to target areas for material reductions/eliminations. Most of these chemicals create an air emission (fugitive or otherwise) when generated or used. Compliance with this policy reduces the generation of hazardous, water and air pollution.

The APG Environmentally Preferred Paint Policy reduces the generation of air emissions. This policy directs all APG personnel to purchase only those architectural coatings that meet the environmental standard set forth in the policy. This policy reduces the amount of volatile organic compounds emitted by paint.

The APG Green Building Policy reduces the generation of air emissions. This policy directs all APG personnel and contractors responsible for capital projects on the installation to: prevent

pollution in all project stages; conserve natural resources; minimize adverse effects on biological and human environments; mitigate adverse air quality effects on the atmosphere as well as the indoor environment; and maximize energy efficiency and use of renewable energy sources.

The APG Environmentally Preferable Product and Affirmative Procurement Policy reduces the generation of air emissions. This policy requires that all APG personnel increase the acquisition of environmentally preferable products and services, unless written justification is provided to the Directorate of Safety, Health and Environment. This policy also encourages all APG personnel to attend environmentally preferable purchasing training.

Army Research Laboratory (ARL), ATC, and the Garrison all use aqueous parts washers for degreasing. In addition, the Ordnance Center and School uses gun-washing units that recycle and reuse cleaning solvent. Solvents volatilize and contribute to the formation of ground-level ozone.

ATC uses low-content VOC paint when performing paint jobs, lowering the amount of VOCs emitted to the environment.

The Edgewood Chemical and Biological Command (ECBC) is supporting the Sustainable Painting Operations for the Total Army effort, a drive undertaken in anticipation of the EPA release of a new National Emission Standards for Hazardous Air Pollutants (NESHAP) covering all DOD facilities. The NESHAP is intended to replace all Hazardous Air Pollutants (HAPs) in solvents used as cleaning products during coating operations. ECBC is supporting this effort by reviewing and testing the soon-to-be released database, canvassing the workforce to determine the degree of HAP use, and determining and implementing technically and economically acceptable alternatives. ECBC will also review the database frequently for new alternatives, screen industry for possible new technologies and products, and assist in implementing the program on a command-wide basis. It is expected that this effort will not only keep Department of Defense facilities in continued operations and keep the Army in EPA compliance, but will provide an environmentally friendly alternative.

7.4 POTENTIAL POLLUTION PREVENTION INITIATIVES

Continue material elimination or substitution, equipment modification, and process improvements as identified through pollution prevention opportunity assessments.

CHAPTER 8 WATER AND WASTEWATER

8.1.1 Prevention Goal

Aberdeen Proving Ground's (APG's) goal is to show a continuous annual reduction in potable water consumption and in wastewater generation.

APG locations operate drinking water systems subject to regulation under the Safe Drinking Water Act and most undertake activities subject to regulation under the Clean Water Act. Water pollution control issues, particularly those addressing industrial wastewater discharges, offer great opportunities for the potential substitution for preferable materials. Experimental or bench top painting, repainting, metal processing and machining, and a variety of other research and development activities at APG locations use large quantities of hazardous materials and generate minute volumes of regulated waste streams. High potential disposal costs, increasing regulatory burdens, and strong regulatory enforcement coupled with the potential for experimental process modifications justify APG's high level of interest in this area.

8.1.2 Baselines and Progress

Table 8-1 **Water Consumption**
(Million of Gallons per year)

Target:
Continuous
Reduction

1999	2000	2001	2002	2003	2006
343.4	419.6	339.4	377.9	442.0	-

Table 8-2 **Wastewater Generation**
(Million of Gallons per year)

Target:
Continuous
Reduction

1999	2000	2001	2002	2003	2006
330.2	321.1	302.8	315.8	271.0	-

8.2 CURRENT POLLUTION PREVENTION INITIATIVES

8.2.1 Army Research Laboratory Installs Waterfree Urinals

The current national standard for new low-consumption urinals specifies a maximum flush volume of 1.0 gallons of water. Innovative technologies led to the development of waterfree technology. In addition to eliminating water from the operation of the urinal, plumbing is also eliminated, which greatly reduces installation costs.

Falcon Waterfree brand urinals use recyclable cartridges that contain a biodegradable liquid. This liquid is lighter than other liquids, and therefore, floats on and seals the urine from the room atmosphere. The cartridge has a design duty life of 7,000 uses. Independent studies have shown that the production of bacteria or ammonia odors are no greater in the waterfree system than in a traditional water flushing system.

The Army Research Laboratory (ARL) Rodman Building at APG installed 4 Falcon Waterless Urinals in August of 2002. Under usual circumstances, the payback period is expected to be approximately 2 years per urinal. However, the City of Aberdeen does not charge APG for its water based on fluctuating use. APG is charged a flat fee for water use, treatment and disposal, irrespective of use. While these waterfree urinals are expected to eliminate approximately 49,000 gallons of water, there is no anticipated cost savings associated with this reduction.

8.2.2 Other Pollution Prevention Initiatives

The APG Pollution Prevention (P2) Policy reduces the use of water and the generation of wastewater. Specifically, the P2 Policy calls for reducing the use of natural resources (such as water), considering and using less polluting processes; improving communication and training regarding pollution prevention initiatives; encouraging the use of environmentally preferable products; and maximizing the reuse and recycling of materials (including water). Compliance with all of these requirements reduces the use of water and the generation of wastewater.

The APG Green Building Policy reduces the use of water and the generation of wastewater. This policy directs all APG personnel and contractors responsible for capital projects on the installation to: prevent pollution in all project stages; conserve natural resources; minimize adverse effects on biological and human environments; employ environmentally sound practices in site selection, layout and landscape; and protect and conserve water resources.

The Aberdeen Test Center (ATC) Churchville, Perryman, Building 338, and Munson wash facilities sanitize and filter wash water through a sand filter, oil/water separator, and ultraviolet (UV)/ozone sanitizers before reuse.

8.3 POTENTIAL POLLUTION PREVENTION INITIATIVES

8.3.1 Low Impact Development

A relatively new technique in stormwater management that aims to maintain a site's natural watershed hydrology through distributed decentralized practices. This includes measures to conserve the natural and physical resources at a site while reducing infrastructure costs and making the landscape more attractive. Low Impact Development (LID) practices include, but are not limited to, methods such as bioretention areas, rain barrels/cisterns, vegetative swales and buffer strips, green roofing, and elimination of curbs and gutters.

The following are the key principles of LID as outlined on the Natural Resources Defense Council's website (<http://www.nrdc.org/water/pollution/storm/chap12.asp>):

- *Integrate stormwater management early in site planning activities*
- *Use natural hydrologic functions as the integrating framework*
- *Focus on prevention rather than mitigation*
- *Emphasize simple, nonstructural, low-tech, and low cost methods*
- *Manage as close to the source as possible*
- *Distribute small-scale practices throughout the landscape*
- *Rely on natural features and processes*
- *Create a multifunctional landscape*

LID is applicable in all new construction as well as retrofits of current sites. With the proper combination of LID practices, it is possible to obtain maximum stormwater control with minimum cost and minimum environmental impact. LID projects also tend to be a source of community pride, resulting in an increased interest in ensuring proper maintenance.

8.3.2 Other Potential Pollution Prevention Initiatives

Continue material elimination or substitution, equipment modification, and process improvements as identified through pollution prevention opportunity assessments.

CHAPTER 9 TOXIC RELEASE INVENTORY FORM R RELEASES

9.1.1 Prevention Goal

Reduce Toxics Release Inventory (TRI) Form R chemical releases 40% overall by December 31, 2006 from a 2001 baseline.

Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) requires annual reporting of releases of toxic chemicals. All installations that manufacture, process, or otherwise use quantities of a toxic chemical in excess of a reporting threshold must annually submit a Form R to the Environmental Protection Agency (EPA). Those reports also are submitted through the chain of command for tracking. The Department of Defense uses the quantity of toxic chemicals released as a general indicator of the performance of its P2 programs. Because TRI releases are used as an indicator of pollution performance, and receive high public visibility, Aberdeen Proving Ground (APG) places great emphasis on reductions to TRI emissions. While many of these emissions also are identified in other media specific areas (based on emission to air, water, off-site disposal, etc) they are recognized here because of the priority given to these chemical-specific issues.

Executive Order (EO) 13148 requires all federal agencies to comply with EPCRA and to commit resources to fulfill the intentions of the PPA. Section 313 of EPCRA requires installations to submit annual TRI reports by July 1 each year for the previous calendar year's data. Installations also are required to prepare a Tier I/Tier II Community Right-to-Know report (under section 311/312 of EPCRA). The report is due March 1 of each calendar year.

APG TRI data is provided to the Installation Management Agency (IMA) headquarters by Army Environmental Center after the consolidation of reports. The information is used to monitor performance against pollution reduction goals. It also is used to identify Command and installation trends related to sources of emissions, chemicals emitted, quantities emitted, and emission pathways. Those trends assist IMA in evaluating policies and identifying needs for improving program performance.

9.1.2 Baseline and Progress

Table 9-1 TRI Form R Releases

(Total pounds released per calendar year)

TRI Form R Chemical	Baseline 2001	2002	2003	Target 2006
Lead	2,583.0	1,319.0	4,223.1	1,033.2
Mercury	-	-	83.4	0

9.2 DESCRIPTION OF FORM R RELEASES

9.2.1 Lead 2001

- 1,848.0 lbs from range munitions activities
- 604.2 lbs lead-contaminated debris hazardous waste from building demolition activities

- 96.7 lbs lead-contaminated bullet trap rubber hazardous waste from range training activities
- 25.0 lbs lead-contaminated hazardous waste from expired shelf-life turn-ins
- 4.8 lbs wastewater treatment lead-contaminated hazardous waste sludge
- 2.7 lbs lead-contaminated soils hazardous waste from Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) activities
- 1.5 lbs lead-contaminated hazardous waste sludge from one-time tank cleaning activities
- 0.1 lbs lead-contaminated hazardous waste from depainting activities

2002

- 858.0 lbs from range munitions activities
- 443.1 lbs lead-contaminated debris hazardous waste from building demolition activities
- 17.0 lbs lead-contaminated hazardous waste from expired shelf-life turn-ins
- 0.5 lbs lead-contaminated sand from range training activities
- 0.4 lbs lead-contaminated hazardous waste from depainting activities

2003

- 4,167.2 lbs from range munitions activities
- 45.8 lbs lead-contaminated debris hazardous waste from building demolition activities
- 7.5 lbs lead-contaminated hazardous waste from expired shelf-life turn-ins
- 1.9 lbs depainting sludge hazardous waste from OC&S paint booths (Buildings 5014 and 5045)
- 0.7 lbs from routine clean-up (floor sweepings) hazardous waste from ARL

9.2.2 Mercury

2003

- 83.4 lbs from laboratory-generated hazardous waste

9.3 CURRENT POLLUTION PREVENTION INITIATIVES

9.3.1 Comprehensive Hazardous Material Management Program

As part of its military readiness mission, APG handles many materials identified as potentially hazardous to public health or the environment. APG's hazardous material management program is designed to accomplish the following goals:

- Reduce risk to APG personnel and the public
- Protect the environment by preventing pollution



Figure 9-1 Each hazardous material container is labeled with a color-coded barcode that remains on it throughout its life cycle.

- Comply with all EPCRA and the Pollution Prevention Act requirements
- Identify P2 opportunities
- Save money

APG is committed to reducing or eliminating the use of hazardous materials whenever possible. When hazardous materials must be used, they must be properly tracked. This is done to monitor use and reductions, ensure compliance with applicable regulations, and protect workers.

The key components of the APG hazardous materials management program are the hazardous material pharmacy (HAZMART) and the Hazardous Inventory Tracking System (HITS). For each hazardous material stored and used at APG, HITS maintains chemical constituent data, chemical hazard information, material safety data sheets, and quantity in stock. This ensures that the installation can produce real-time inventories, meet reporting requirements, and track P2 progress.

Regardless of the point of entry, each hazardous material container is labeled with a color-coded barcode that remains on it throughout its life cycle (see Figure 9-1). Barcode colors are changed annually and give hazardous materials managers a visual perspective of hazardous materials stocks and their age without consulting lengthy inventory lists. The APG P2 Program distributes signs that illustrate barcode colors and corresponding years (see Figure 9-2). APG's hazardous materials barcodes offer one other way for users to visually manage their inventory. The first digit of the barcode represents the last digit of the year that the item was barcoded.



Figure 9-2 A poster displays the hazardous material yearly barcode color changes.

HITS has a shelf-life tracking feature that allows for early notification that a product is within 90, 60, and 30 days of its posted expiration date. This allows the user to rotate the stock, ensuring use of the product, and saving disposal costs.

HITS users can set upper and lower inventory limits. After inventory limits are set, users can generate inventory reports indicating which items they need to order more of and which items they do not. This new HITS function was developed to help activities maintain a just in time inventory and avoid overstocking.

The HAZMART uses HITS to manage a program called Freebies. Freebies is a materials exchange program. APG activities designate materials that they have that are in excess but still usable. These designated materials are added to a database that can be accessed by HITS users. This database is called the Freebies List. If a HITS user finds a material that they need on the list they can arrange a transfer between activities at no cost to either party.

HITS is designed to serve the entire installation, including all APG activities, tenants, and contractors. Through HITS, the Directorate of Safety, Health and Environment (DSHE) has access to installation wide information so as to prepare required reports; track progress on meeting P2 objectives; and respond to health, safety, and fire protection concerns.

DSHE can use data from HITS when developing or reviewing environmental impact statements under National Environmental Protection Act regulations, calculating air emission data, and preparing reports in compliance with environmental protection permits. HITS can also be used to compile information to send to employees and residents of APG, Harford County, and the State of Maryland.

HITS and the HAZMART assist APG in meeting its aggressive P2 goals by ensuring the integrity of the data needed to analyze and monitor operations and to determine which chemicals must be eliminated because of hazardous content, toxic chemical releases, or hazardous waste generation.

The DSHE P2 Program offers HITS training classes to teach HITS users how to use take advantage of the many environmental management features of HITS.

9.3.2 Other Pollution Prevention Initiatives

The APG P2 Policy reduces the use of TRI Form R chemicals. Specifically, the P2 Policy calls for the reduction of excessive purchasing and/or stocking of materials (hazardous or otherwise); considering and using less polluting processes; improving communication and training regarding pollution prevention initiatives; encouraging the use of environmentally preferable products; maximizing the reuse and recycling of materials (hazardous or otherwise); and ensuring the use of non-toxic, low maintenance materials.

The APG Hazardous Materials Management Policy reduces the use of TRI Form R chemicals. By maintaining an automated inventory, the Hazardous Inventory Tracking System (HITS), the installation is able to track the locations and quantities of all hazardous chemicals, including TRI/Tier II listed chemicals. This system is used to target areas for material reductions/eliminations. Materials tracking lies at the very heart of pollution prevention.

The APG Environmentally Preferred Paint Policy eliminates the use of TRI Form R chemicals used in some paints. This policy directs all APG personnel to purchase only those architectural coatings that meet the environmental standard set forth in the policy. This policy names specific prohibited metals and compounds, most of which are TRI chemicals.

The APG Green Building Policy reduces the use of TRI Form R chemicals. This policy directs all APG personnel and contractors responsible for capital projects on the installation to: prevent pollution in all project stages; minimize adverse effects on biological and human environments; mitigate adverse air quality effects of the atmosphere as well as the indoor environment; and maximize recycling and waste minimization.

The APG Environmentally Preferable Product and Affirmative Procurement Policy reduces the use of TRI Form R chemicals. This policy requires that all APG personnel increase the acquisition of environmentally preferable products and services, unless written justification is provided to DSHE. This policy also encourages all APG personnel to attend environmentally preferable purchasing training.

The Army Research Laboratory (ARL) has made the following substitutions of non-TRI chemicals for TRI chemicals:

- Branson EC Cleaner for isopropyl alcohol and methyl ethyl ketone (MEK)

-
- Orange SOL for acetone, isopropyl alcohol and MEK
 - Flux Remover for isopropyl alcohol and 1,1,1 trichloroethane (TCE)

The Aberdeen Test Center (ATC) has switched from using Brake Kleen solvent to ShopSolv solvent in building 402. Brake Kleen solvent was purchased and used in 18-ounce individual aerosol containers. ShopSolv is purchased in 55-gallon drums and dispensed into hand-held, air-charged sprayers. This substitution will reduce the volume of aerosol cans needing to be disposed of by two 55-gallon drums every month. The estimated savings are expected to be \$2,400 per year.

The DSHE P2 Program created an educational and informative website (www.apg.army.mil/ap2g/index.htm). This website contains all of the information previously maintained in the P2 Handbook. Additionally, it contains links to reports published by the DSHE P2 Program, regulations, training slide shows, newspaper articles, manuals, and more. This website is reviewed periodically to keep it as up to date as possible.

The DSHE P2 Program created a new training tool to raise P2 awareness. P2 Land is a competitive trivia game that is used in training classes to reinforce important lecture points and raise general environmental awareness. A non-competitive version has been posted on the P2 Programs website.

9.4 POTENTIAL POLLUTION PREVENTION INITIATIVES

Continue material elimination or substitution, equipment modification, and process improvements as identified through pollution prevention opportunity assessments.

CHAPTER 10 EPA PRIORITY CHEMICAL REDUCTION

10.1.1 Prevention Goal

Aberdeen Proving Ground (APG)'s goal is to reduce the use of selected toxic chemicals and hazardous substances as well as the generation of hazardous and radioactive waste by 50 percent by December 31, 2006, through the identification of proven substitutes and established facility management practices, including pollution prevention (P2).

Pursuant to Executive Order (EO) 13148, the Environmental Protection Agency (EPA) identified a list of priority chemicals used by the Federal Government in identified applications and purposes that may result in significant harm to human health or the environment. The baseline for this reduction is 2002.

Like Toxic Release Inventory (TRI) emissions, the reduction in use of these chemicals may be linked to reducing waste streams in other media specific areas (based on emission to air, water, off-site disposal, etc), however, the emphasis will be the reduction in use of a specific chemicals in a particular application.

APG has and will continue to participate in Installation Management Agency, Department of Defense, and Federal agency workgroups to establish lists and baselines and implement programs to support the reduction in use of these priority chemicals. APG headquarters will work to ensure the least impact on mission activities and highest return on projects to eliminate these chemicals. APG also will work internally to ensure the appropriate level of technical support is provided for its installations to develop approaches to achieve chemical reduction goals.

10.1.2 Baseline and Progress

Table 10-1 **Waste Minimization Priority Chemicals**
(pounds used per calendar year)

EPA Chemical	CAS	Baseline 2002	2003	Target
1,2,4-Trichlorobenzene	120-82-1	0.91	1.82	.46
1,2,4,5-Tetrachlorobenzene	95-94-3	0	0	0
2,4,5-Trichlorophenol	95-95-4	0	0	0
4-Bromophenyl phenyl ether	101-55-3	0	0	0
Acenaphthene	83-32-9	0	0	0
Acenaphthylene	208-96-8	0	0	0
Anthracene	120-12-7	39.75	5.02	19.88
Benzo(g,h,i)perylene	191-24-2	0	0	0
Dibenzofuran	132-64-9	0	1.7	0

Dioxins/Furans (considered one chemical on this list)		0	0	0
Endosulfan, alpha & Endosulfan, beta (considered one chemical on this list)	959-98-8 33213-65-9	0	0	0
Fluorene	86-73-7	0.01	0	.005
Heptachlor & Heptachlor epoxide (considered one chemical on this list)	76-44-8 1024-57-3	0	0	0
Hexachlorobenzene	118-74-1	0	0	0
Hexachlorobutadiene	87-68-3	0	0	0
Hexachlorocyclohexane, gamma-	58-89-9	0	0	0
Hexachloroethane	67-72-1	0	0	0
Methoxychlor	72-43-5	0	0	0
Naphthalene	91-20-3	0	199.44	0
BENZ[A]ANTHRACENE	56-55-3	0	0	0
BENZO[B]FLUORANTHENE	205-99-2	0	0	0
BENZO[J]FLUORANTHENE	205-82-3	0	0	0
BENZO[K]FLUORANTHENE	207-08-9	0	0	0
BENZO[A]PYRENE	50-32-8	0	0.5	0
DIBENZ[A,H]ACRIDINE	226-36-8	0	0	0
DIBENZ[A,J]ACRIDINE	224-42-0	0	0	0
DIBENZ[A,H]ANTHRACENE	53-70-3	0	0	0
7H-DIBENZO[C,G]CARBAZOLE	194-59-2	0	0	0
DIBENZO[A,E]PYRENE	191-30-0	0	0	0
INDENO[1,2,3-CD]PYRENE	193-39-5	0	0	0
5-METHYLCHRYSENE	3697-24-3	0	0	0
Pendimethalin	40487-42-1	0	18	0
Pentachlorobenzene	608-93-5	0	0	0
Pentachloronitrobenzene	82-68-8	0	0	0
Pentachlorophenol	87-86-5	0	0	0
Phenanthrene	85-01-8	0	0	0
Pyrene	129-00-0	0	1	0
Trifluralin	1582-09-8	0	0	0
Cadmium	7440-43-9	0.17	8.8	0.09
Lead	7439-92-1	38.82	9.68	19.41
Mercury	7439-97-6	5.01	71.25	2.50
Total Use		84.67	316.71	42.34

10.2 CURRENT POLLUTION PREVENTION INITIATIVES

The APG P2 Policy reduces the use of EPA Priority chemicals. Specifically, the P2 Policy calls for the reduction of excessive purchasing and/or stocking of materials (hazardous or otherwise);

considering and using less polluting processes; improving communication and training regarding pollution prevention initiatives; encouraging the use of environmentally preferable products; maximizing the reuse and recycling of materials (hazardous or otherwise); and ensuring the use of non-toxic, low maintenance materials.


The APG Hazardous Materials Management Policy reduces the use of EPA Priority Chemicals. By maintaining an automated inventory, the Hazardous Inventory Tracking System (HITS), the installation is able to track the locations and quantities of all hazardous chemicals, including TRI/Tier II listed chemicals. This system is used to target areas for material reductions/eliminations. Materials tracking lies at the very heart of pollution prevention.

The APG Environmentally Preferred Paint Policy eliminates the use of EPA Priority chemicals used in some paints. This policy directs all APG personnel to purchase only those architectural coatings that meet the environmental standard set forth in the policy. This policy names specific prohibited metals, most of which are EPA Priority chemicals.

The APG Green Building Policy reduces the use of EPA Priority chemicals. This policy directs all APG personnel and contractors responsible for capital projects on the installation to: prevent pollution in all project stages; minimize adverse effects on biological and human environments; mitigate adverse air quality effects of the atmosphere as well as the indoor environment; and maximize recycling and waste minimization.

The APG Environmentally Preferable Product and Affirmative Procurement Policy reduces the use of EPA Priority chemicals. This policy requires that all APG personnel increase the acquisition of environmentally preferable products and services, unless written justification is provided to the Directorate of Safety, Health and Environment. This policy also encourages all APG personnel to attend environmentally preferable purchasing training.

The Aberdeen Test Center (ATC) Environmental Team personnel, using data from the HITS, have identified products containing persistent bioaccumulative toxic chemicals (PBT) in the ATC inventory. These products cannot be reordered unless an environmentally preferable alternative is not available.

HITS labels items that contain PBTs with the following symbol . Products for which substitutes have been identified are linked to their environmentally preferable substitutes enabling users to easily choose safer products.

10.3 POTENTIAL POLLUTION PREVENTION INITIATIVES

Continue material elimination or substitution, equipment modification, and process improvements as identified through pollution prevention opportunity assessments.

CHAPTER 11 OZONE DEPLETING SUBSTANCES

11.1 PREVENTION GOAL

Phase out the procurement of Class I ozone depleting substances (ODSs) for all unaccepted uses by December 31, 2010, by evaluating present and future uses of ODSs and by maximizing the purchase and use of safe, cost-effective, and environmentally preferable alternatives.

In July 1997, the Army issued a revised policy for the elimination of ODSs from Army installations. The Assistant Chief of Staff Installation Management Memorandum, DAIM-ED-P2, 3 July 1997, Elimination of the Dependency on Ozone-Depleting Substances (ODSs) in Army Facilities, stated the following points:

- Installation commanders are responsible for ODS elimination.
- All tenant commanders are responsible for complying with host ODS policies and supporting host ODS elimination efforts.
- Class I ODSs must be eliminated from all facilities on Army installations by the end of fiscal year (FY) 2003.
- Installations may not contract for the use of Class I ODSs.
- All Class I ODSs installed in Army facilities must be recovered.

Some Aberdeen Proving Ground (APG) operations have used ODSs. Examples may include air conditioners, refrigeration systems, ice machines, fire suppression systems, etc. EO 13148 requires that facilities develop a plan to phase-out the procurement of Class I ODS by 31 December 2010. APG's ODS plans are held at the Environmental Compliance Division office where they are required.

11.2 BASELINE AND PROGRESS

Table 11-1 Class I Ozone Depleting Substances (Total pounds in inventory)				Target: 0 lbs
1999	2000	2001	2002	2003
32332.6	25789.24	14052.28	14226.76	9579.41

11.3 DESCRIPTION OF ODS-CONTAINING EQUIPMENT

11.4 CURRENT POLLUTION PREVENTION INITIATIVES

APG Pollution Prevention (P2) Policy supports the elimination of ozone depleting substances. Specifically, the P2 Policy calls for the reduction of excessive purchasing and/or stocking of materials (hazardous or otherwise); considering and using less polluting processes; improving communication and training regarding pollution prevention initiatives; encouraging the use of

environmentally preferable products; and ensuring the use of non-toxic, low maintenance materials. Compliance with all of these requirements supports the elimination of ODSs

The APG Hazardous Materials Management Policy supports the elimination of ozone depleting substances. By maintaining an automated inventory, the Hazardous Inventory Tracking System, the installation is able to track the locations and quantities of all hazardous chemicals, including ODSs. This system is used to target areas for reductions/eliminations. Some of these chemicals contain ODSs. Compliance with this policy supports the target and elimination of these materials.

The APG Green Building Policy supports the elimination of ODSs. This policy directs all APG personnel and contractors responsible for capital projects on the installation to: prevent pollution in all project stages; minimize adverse effects on biological and human environments; and mitigate adverse air quality effects on the atmosphere as well as the indoor environment. This policy ensures that no ozone depleting substances are used during the construction or renovation of any building, including the HVAC or fire suppression systems.

The APG Environmentally Preferable Product and Affirmative Procurement Policy supports the elimination of ozone depleting substances. This policy requires that all APG personnel increase the acquisition of environmentally preferable products and services, unless written justification is provided to the Directorate of Safety, Health and Environment. This policy also encourages all APG personnel to attend environmentally preferable purchasing training.

By 1997, class I ODSs were eliminated in all large refrigeration units at APG through retrofit or replacement. Class I ODSs are purchased only when acceptable substitutes are not available, and these purchases must be approved by senior personnel. All APG purchase requests require a signature to the statement "A review of this PR&C [purchase request and commitment] revealed that class I ODSs are not a requirement and are not an option."

11.5 POTENTIAL POLLUTION PREVENTION INITIATIVES

Complete elimination of all ODSs.

CHAPTER 12 VEHICLE FUEL CONSERVATION

12.1 PREVENTION GOALS

Executive Order (EO) 13149 establishes goals to improve the average fuel economy to increase the use of alternative fuels for fleet vehicles. Note that this order exempts tactical military vehicles, law enforcement vehicles, and emergency vehicles from its requirements. Aberdeen Proving Ground (APG) program managers will provide oversight of compliance with EO 13149.

According to the Department of Defense (DOD)'s Alternative Fueled Vehicles Measure of Merit, the following goals must be met:

- Increase the average EPA fuel economy of cars and light trucks by at 1 mpg by the end of FY 2002 and 3 mpg by the end of FY 2005 from a FY 1999 baseline.
- Reduce vehicle petroleum consumption 20% by the end of FY 2005 from a FY 1999 baseline.
- Ensure that alternative fuels account for at least 50% of the fuels used in dual-fuel, alternative fuel vehicles.
- Ensure that at least 75% of car and light truck procurements are alternatively-fueled vehicles.

12.2 BASELINES AND PROGRESS

Table 12-1 **Vehicle Fuel Use**
(total gallons consumed for non-tactical fleet vehicles)

			Target:
2002	2003	2004	FY 2005
1234.52	2401.64	1650.00	987.62

Table 12-2 **Alternative Fueled Vehicle Procurement**
(% of vehicles procured that are alternatively fueled)

				Target:
2000	2001	2002	2003	2005
44%	18%	13%	41%	50%

12.3 CURRENT POLLUTION PREVENTION INITIATIVES

The APG Pollution Prevention (P2) Policy reduces the use of gasoline. Specifically, the P2 Policy calls for the reduction of excessive purchasing and/or stocking of materials (hazardous or otherwise); reducing the use of natural resources (such as fuels), considering and using less polluting processes; improving communication and training regarding pollution prevention initiatives; encouraging the use of environmentally preferable products; maximizing the reuse

and recycling of materials (hazardous or otherwise); and ensuring the use of non-toxic, low maintenance materials.

The APG Hazardous Materials Management Policy reduces the use of gasoline. By maintaining an automated inventory, the Hazardous Inventory Tracking System, the installation is able to track the locations and quantities of all hazardous chemicals, including fuels. This system is used to target areas for material reductions/eliminations.

APG currently has 12 dedicated compressed natural gas (CNG) vehicles, 74 bi-fueled vehicles, and 42 gas/ethanol vehicles. In 2002 there were 11 CNG vehicles; 82 bi-fueled vehicles; and 32 gas/ethanol vehicles. In 1998, 27.5% of the 254 vehicles purchased at APG were alternatively fueled.

The Army Research Laboratory (ARL) employees drive CNG and hybrid vehicles.

ARL is engineering hybrid tactical vehicles.

12.4 POTENTIAL POLLUTION PREVENTION INITIATIVES

Construction of a CNG facility at Edgewood.

Conduct a pollution prevention opportunity assessment on the fuel economy of government vehicles (gas vs. CNG)

Research introduction of biodiesel.

CHAPTER 13 ENERGY CONSERVATION

13.1 PREVENTION GOAL

Reduce facility energy consumption 35% by 2010 from a 1985 baseline. Note that the Executive Order (EO) 13123 allows for a separate, less stringent goal for industrial and laboratory activities. However, Aberdeen Proving Ground (APG) does not track energy consumption separately for such activities. As a result, the 30-35% (more stringent) reduction goal will apply to the installation as a whole.

13.2 BASELINE AND PROGRESS

Table 13-1 Energy Consumption
(Million BTUs/1000 SF)

Baseline						Target: 27% less Base Line
FY 1985	2000	2001	2002	2003	2004	FY 2005
205	155.01	153.6	146.4	178.6	Est. 180	148

13.3 CURRENT POLLUTION PREVENTION INITIATIVES

The Draft APG Energy Efficient Standby Power Devices Policy will reduce energy consumption. This policy requires that off-the-shelf products that use external standby power devices or contain an internal standby-power function, use no more than one watt in their standby power-consuming mode.

The APG Pollution Prevention (P2) Policy reduces energy use. Specifically, the P2 Policy calls for reducing the use of natural resources (such as fuels), considering and using less polluting processes; and improving communication and training regarding P2 initiatives. Compliance with these requirements reduces energy consumption.

The APG Green Building Policy reduces energy consumption. This policy directs all APG personnel and contractors responsible for capital projects on the installation to: prevent pollution in all project stages; conserve natural resources; minimize adverse effects on biological and human environments; mitigate adverse air quality effects on the atmosphere as well as the indoor environment; employ environmentally sound practices in site selection, layout and landscape; and maximize energy efficiency and use of renewable energy sources.

Project Aberdeen Conserves Energy emphasizes energy conservation awareness and education for all APG employees by organizing energy action teams and generating publicity. Approximately 250 building energy monitors have been trained, and residents and employees are informed of the program through various forms of publicity including banners, newspaper articles, and posters. The Directorate of Installation Operations (DIO) continues an aggressive energy conservation program that includes holiday closures and compressed work schedules for employees. Beginning with the 1997 Thanksgiving holiday, all employees have been encouraged to take one additional day of leave so that the majority of facilities on the installation are closed for four consecutive days. Lighting, equipment, and computers are turned off during

this period, which results in substantial energy savings. Since March 26, 1998, 66 percent of the APG workforce has been on compressed work schedules, and some major activities are on a uniform compressed work schedule, resulting in the closure of many facilities for 20, three-day weekends. DIO estimates a potential savings of 93,679 million British thermal units and \$1 million per year from the holiday closing and compressed work schedule initiatives. APG was selected as the Army Materiel Command Energy Award Winner for 2002 and has been nominated by the command for the Secretary of the Army Award.

APG, an Environmental Protection Agency (EPA) Green Lights partner, has completed replacing standard polychlorinated biphenyl (PCB) containing fluorescent light ballasts with energy-efficient, mercury-free, electronic ballasts. With more than 98 percent of the retrofits complete, DIO met its Green Lights goal four years ahead of schedule. The remaining two percent of the fixtures have a smaller payback and will be replaced by the end of their life or upon failure. The new fixtures last longer and reduce electricity demand by more than 5 megawatts and annual consumption by more than 6,050,000 megawatts. DIO estimates that the \$4 million project saves the installation \$1.2 million per year.

APG has completed the conversion of 16 large boiler plants to natural gas as the primary fuel source. Also 55 smaller buildings have firm service natural gas. Also APG purchases steam from a Waste to Energy Plant that uses a renewable source of municipal trash to make steam.

13.4 POTENTIAL POLLUTION PREVENTION INITIATIVES

Install light-emitting diode exit lights throughout the Installation.

Replace emergency lights with non-hazardous, energy-efficient lights.

CHAPTER 14 AFFIRMATIVE PROCUREMENT

14.1 PREVENTION GOALS

Train procurement officers.

Integrate affirmative procurement (AP) into developing plans, work statements, and specifications.

14.2 BASELINE AND PROGRESS

14.3 CURRENT POLLUTION PREVENTION INITIATIVES

14.3.1 Environmentally Preferable Purchasing at the Office Eagle



Aberdeen Proving Ground's (APG's) Pollution Prevention (P2) Program has been promoting AP and environmentally preferable purchasing (EPP) at the Aberdeen and Edgewood Office Eagles for several years. P2 Program staff inspects the Office Eagle stores monthly and places labels on the shelves beneath the most environmentally preferable products to encourage consumer awareness (see Figure 14-1). There is a poster at the front of each store that

defines the criteria used to choose EPP (see Figure 14-2).

Figure 14-1 Environmentally Preferable Products in the Office Eagle are labeled with an Aberdeen Proving Ground Pollution Prevention Program logo.

Blind Industry and Services of Maryland (BISM) signed a Memorandum of Agreement (MOA) with APG's P2 Program that states that before the Office Eagle stocks any new hazardous materials that the P2 Program staff will be provided the opportunity to identify a more environmentally preferable product. The following is an excerpt from the before mentioned MOA.

“(2) Pollution Prevention Program.

- (a) Purchase only essential quantities of hazardous materials as authorized.*
- (b) Properly track all hazardous materials using the APG automated tracking system (HITS).*
- (c) Purchase products made from recovered materials and products that are environmentally preferable and energy efficient in accordance with Executive Order 13101.*
- (d) Ensure that excess hazardous materials are reissued or recycled. Unopened/unused/unexpired hazardous materials (either returned by an activity or BISM items that are overstocked) can be declared as excess and listed on the “Freebies List”*

or turned into the Defense Reutilization and Marketing Office (DRMO) for reissue or recycle at no cost to the government. Items that cannot be redistributed by DRMO will be returned to BISM for disposal in accordance with federal, state and local regulations. Return of hazardous material items to BISM that were not originally purchased from BISM is not permissible.

- (e) Reuse and recycle materials.
- (f) Stock non—toxic, low maintenance, durable materials.
- (g) Attend pollution prevention training and outreach events.
- (h) Comply with all APG policies and procedures concerning pollution prevention.
- (i) Provide for the sale of recycled products in accordance with Executive Order 13101 and the Recovered Materials Advisory Notice.
- (j) Provide for the sale of environmentally preferable products in accordance with Executive Order 13101.

(3) **Hazardous Material Management.**

(a) BISM shall not stock hazardous materials (i.e., chemicals or chemical products as defined in the Installation Hazardous Materials Management Policy and Call for Reduction Strategies) or hazardous articles (i.e., lead—acid batteries) without the written approval of the APG Directorate of Safety, Health and Environment (DSHE). Routine, non— aerosol housekeeping supplies are exempt from purchase/stocking restrictions, however, bulk (case lots) warehousing of such products requires compliance with APG hazardous materials (HM) policy and management requirements. Aerosols of any kind and any petroleum-based products must be tracked by container in accordance with the APG Hazardous Materials Management Policy.

(b) All BISM and/or user request(s) to stock and/or purchase non— approved hazardous materials shall be accompanied by a justification for each chemical/chemical product and include the applicable material safety data sheet (MSDS). Justifications, MSDSs and any accompanying documentation shall be submitted to the APG DSHE for written approval prior to purchase and stocking.

(c) BISM shall maintain electronic link(s) via computer to the Hazardous Inventory Tracking System (HITS). APG will be responsible for maintenance of the connectivity. HITS will provide both BISM and the customer copies of validated MSDSs.

BISM shall furnish MSDSs to customers, when requested. BISM shall not place new HM items in stock without ensuring that the HAZMART Data Input Form (STEAP—SH Form 1 01 —R for container labeling information only) along with a copy of the MSDS is provided to the installation HAZMART for validation of both label and MSDS information. This can be accomplished with the assistance of the HAZMART personnel.”



Figure 14-2 Posters explaining the criteria used to determine environmental preferability hang in the front of each Aberdeen Proving Ground Office Eagle.

14.3.2 Spray Paint Substitution at Army Research Laboratory

Spray paints constitute approximately 14% of the Army Research Laboratory's (ARL's) hazardous materials inventory at APG. Most of these paints are So-Sure Enamel, a petroleum-based product. Each of the petroleum-based aerosol spray paints in ARL's inventory contains Toxics Release Inventory (TRI) chemicals, and each of these paints also contains more chemicals than the acceptable water-based alternative.

The proposed alternatives to the Eco-Sure and So-Sure paints widely used at ARL are Krylon's latex Home Décor and Kids Tuff spray paints. The ARL does not necessarily endorse Krylon spray paints, but there are no other known aerosols that meet the environmental and performance requirements of this paint. Should another spray paint exist or be developed that meets or exceeds the criteria of these Krylon latex spray paints, they may be listed as examples of paint meeting the preferred criteria. These Krylon paints contain the least number of chemicals, come in a variety of colors, and perform to the satisfaction of ARL's largest aerosol spray paint users. The Krylon latex paint even out-performs obliterating compounds in less coats.

Listed below are the chemical ingredients for each of the major brands of aerosol paints in the ARL inventory for different popular colors. By replacing these paints with Home Décor or Kids Tuff, the inventory can be significantly improved through the elimination of TRI and extraneous chemicals.

Eco-Sure, 10 chemicals total, including 2 TRI chemicals

xylene, propane, dimethyl ether, methyl hexanone, aromatic 160, aromatic 150, pentanone, methyl pentanone, trimethylbenzene, butanol

So-Sure Obliterating Compound, 8 chemicals, including 2 TRI chemicals

Acetone, propane, toluene, naphtha, butane, methyl propane, Stoddard solvent, xylene

So-Sure Enamel, 13 chemicals, 3 TRI listed chemicals

Acetone, propane, toluene, mineral spirits, butane, methyl propane, methoxy methyl ethyl acetate, xylene, methyl hexanone, copper phthalocyanine, ethylbenzene, naphtha, butanone

Krylon Home Décor, 5 chemicals, NO TRI chemicals

Propanol, butoxyethanol, dimethyl ether, amorphous precipitated silica, titanium dioxide

Recommendations:



- Dispose of old, unusable paints;
- Use usable paint until depleted;
- When current stocks are depleted, order Krylon latex paint only, unless another type of paint is justified or required.

14.3.3 Other Pollution Prevention Initiatives

The APG EPP and Affirmative Procurement Policy increases affirmative procurement. This policy requires that all APG personnel increase the acquisition of environmentally preferable products and services, unless written justification is provided to the DSHE. This policy also encourages all APG personnel to attend environmentally preferable purchasing training.

The APG P2 Policy increases AP. Specifically, the P2 Policy calls for reducing the use of natural resources; considering and using less polluting processes; improving communication and training regarding pollution prevention initiatives; encouraging the use of environmentally preferable products; and ensuring the use of non-toxic, low maintenance materials.

The APG Green Building Policy increases AP. This policy directs all APG personnel and contractors responsible for capital projects on the installation to: prevent pollution in all project stages; conserve natural resources; minimize adverse effects on biological and human environments; mitigate adverse air quality effects on the atmosphere as well as the indoor environment; and maximize energy efficiency and use of renewable energy sources.

APG uses HITS to promote its EPP program. For many of the hazardous materials cataloged in HITS, the APG P2 Program has identified EPP alternatives. These alternatives are marked with an EPP symbol  within the system while the products they may replace are marked with a symbol  indicating that they should not be bought because comparable substitutes are available. Inventory managers are encouraged to conduct regular quality assurance checks to ensure the purchase of such items.

APG's P2 Program has worked with Army Materiel Command trainers to create an AP module that has been included as part of the standard training for all government credit card holders at APG. The P2 Program periodically conducts EPP refresher training for contracting personnel.

The APG P2 Program is currently working on a pollution prevention opportunity assessment (PPOA) with the Directorate of Installation Operations (DIO's) Re-Nu-It Center. As part of this process, the inventory is being reviewed for opportunities to incorporate EPP.

The APG P2 Program incorporates green building into the design review process by reviewing all DIO construction projects to specify green building opportunities where applicable. This includes, but is not limited to:

- Ensuring that all new products comply with the Environmental Protection Agency (EPA) Comprehensive Guidelines for Procurement policy, Executive Order 13101 and Federal Acquisition Regulations.
- Advocating the use of low or maintenance-free materials.
- Educating project planners in Sustainable Design practices.

The APG P2 Program researches new green building technologies and recommend wherever pertinent.

Army Environmental Center's new headquarters is being built to Platinum level SPiRiT.

The Aberdeen Test Center Environmental Team personnel review all supply order forms to ensure minimum use of products containing hazardous materials and maximum use of recycled content products.

All new buildings at APG are to be built to Gold level SPiRiT.

14.4 POTENTIAL POLLUTION PREVENTION INITIATIVES

The Directorate of Installation Operations is planning to deconstruct two warehouses in the 500 block. The contractor is going to use the materials to build barns, sheds, and stables for Amish farmers. The value of this material is estimated to be \$32,000.

Where possible, amend contract specifications to include requirements for the use of recycled building materials such as carpeting, plastic lumber, and alternative energy sources.

Increase the scrutiny being placed on procurement actions to minimize chemical purchases while maximizing the procurement of recycled materials.

Provide Sustainable Design and Development training for construction contractors. This could be a formal training class or in an informal manner in which the contract would submit a list of regularly purchased construction materials for review.

Incorporate a sustainability component in contract award process.

Implement an improved building hygiene program.

- Train housekeepers in cleaning methods that would promote a more sanitary working environment.
- Use more efficient and safe chemical cleaning products.
- Develop mold reduction/elimination strategy.

Conduct regular inspections of current construction projects to ensure and enforce the use of Environmentally preferable building products.

Provide the cashiers and store managers at the Office Eagles with HITS access. Logging materials out of the Office Eagle inventory at the time of purchase would improve the accuracy of the hazardous materials inventory. Additionally, having local access to HITS would allow the store managers to better manage their environmentally preferable purchasing as well as monitor their inventory for expired and soon to be expired items.

Pollution prevention opportunity assessment (PPOA) to determine feasibility of using absorbent products derived from post consumer recycled material (e.g., paper) to clean-up spills of petroleum products and reusing the clean-up debris as higher BTU fuels for steam recovery or as an alternative fuel source.

Ancillary PPOA to determine feasibility of using post consumer recycled paper generated at APG as raw material for absorbent products to clean-up petroleum spills.